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E. D. GRAFF, Editor, 185 N. Wabash Ave., Chicago
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EDITORIALS

Favorable Publicity Needed

Conditions which the telephone industry now faces impress us with the belief that there is urgent need for some kind of concerted action to revive what used to be referred to as the publicity or public relations department.

* * *

There is no denying that where such a department once functioned properly many shocks were softened and many clashes with the public either avoided altogether or the consequences modified. True, there were mistakes, some of them costly, but mistakes are common in all departments, and a needed service should not be discarded because here and there someone has blundered.

Right now the telephone industry along with

other public utilities is the object of a fierce attack throughout the nation. It is being demanded that they take their losses along with other industries and reduce their rates in proportion to reductions in other lines. And the mutterings are growing into uncomfortable warnings.

* * *

As a matter of fact the telephone business has already taken its losses in many ways. But does the public know this? Certainly not. How can the public know unless the information is imparted by someone, and who is going to do it unless it is done by the telephone companies? This, of course, is only one instance in which favorable publicity is needed.

* * *

It seems that some plan might be worked out for maintaining public relations bureaus in a co-operative way that would provide the needed service at a cost which would not be a burden. Groups of operating companies in certain districts might co-operate, or state associations or perhaps the national association. As important as the subject appears to us, many of the larger companies might well economize along some other line rather than neglect to use every means to maintain the most pleasant and harmonious relations with their patrons.

* * *

Political Doctors People hear so much about what may result from the election of this or that candidate for governor or president that sometimes they begin to actually expect some kind of change in business or economic conditions following an election.

* * *

Especially is this true of presidential elections. In fact, the opinion has become so prevalent that a certain timidity, or fear or lack of confidence dominates the minds of a very large percentage of the population of the country to such an extent that business is throttled and industrial progress impeded. Perhaps, more than anyone suspects, this may be one of the obstacles now checking the heroic struggles which business is making to come back. If so, it is fortunate that this anxiety will soon be over.

* * *

But, really, can the country expect much from the political doctors? Of course, we are not referring to the individual interests of public utilities. One candidate might be more unfriendly to their interests than another and thus raise the question as to how they might fare, should this or that one be elected. But we are speaking here of the interests of business and industry as a whole and throughout the nation. And when thus considered is there any reason to expect much from politics? Which is another way of asking if we may reasonably expect much from the government.

* * *

One way to answer this question is to consider the causes of the nation's periodical seasons of depression or business stagnation. Manifestly such a discussion here would require too much space for anyone to read it, if the writer were capable of properly diagnosing the causes. But it will doubtless be readily agreed without argument that the present depression was not caused by politics or legislation. Whatever may be one's idea of whether it has been accentuated or impeded by legislation since it began, it is safe to say that all will agree that politics or legislation did not start it.

* * *

This granted, isn't it about as ridiculous to expect business to recover through political manipulation as it would be from a rubbing of Aladdin's lamp or a wave of a magic wand? Rather may we not look for recovery through the operation of an adjustment of economic conditions?

* * *

For instance, the country has been suffering, among other things, from the folly of an era of over buying, over building and rampant speculation. To many careful observers and close students it has become adjusted to its over buying and building, and its speculation losses have been marked off the books. Manifestly then, it is ready for another period of construction, as soon as those who are in a position to advance can muster up courage to make the start.

* * *

For, whatever the causes may have been, they were not political and the remedy is not political. Our own opinion is that the public has already applied the remedy to a marked extent in its return to rigid economy, curtailment of debts and lessening of speculation. And, since the wild orgy of buying has been over for almost three years we have caught up with production in all lines but agriculture and we would catch up with that before another crop is made if the wheels of industry and commerce and public improvements could only be set into motion to give employment to idle labor. It seems that this idea is beginning to permeate the minds of large executives and in all parts of the country the wheels are beginning to be oiled for the running.

Acid Core Solder Used in Telephone Work

In the Following Article B. C. Burden, Transmission Engineer, Lincoln Tel. & Tel. Company of Lincoln, Nebraska, Explains Fully How Telephone Men Have Come to Recognize Acid Core Solder As Invaluable for Outside Plant Work.

General

The importance of solder in connection with inside plant work has long been stressed, and is generally appreciated. Every competent telephone man knows that for this work only rosin core solder should be used as the acid core type of solder will deposit a fine acid spray on the objects being soldered, and this may cause leakage currents to flow from one terminal to another, and in some cases might corrode metal parts on which the acid spray is deposited.

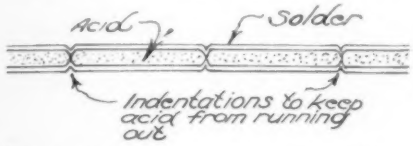


Fig. 1. Construction of acid core solder.

As the result of the constant admonition to "never use acid core solder on inside work" many telephone men have come to the conclusion that this type of solder has no application in the telephone plant.

This is an erroneous conclusion as acid core solder can and has played an important part in telephone maintenance practises. In connection with the overhauling of old iron and copper wire lines, acid core solder is invaluable, for resoldering tails on ground rods, and for soldering jumper wires to open iron wires acid core solder makes a hard job easy.

It is the purpose of this article to discuss how acid core solder can be used to advantage in outside plant work.

Soldering Theory

The process of soldering consists in joining two metals together by means of a low melting point alloy which unites with the metals being soldered. The solder actually "alloys" itself with the surface of the metal being soldered.

The electrical resistance of a soldered connection is virtually zero, whereas if two conducting surfaces are merely held in contact with each other without soldering, the resistance may be any value from zero to infinity, depending on the pressure of the contact, and whether or not the contacting surfaces are clean.

Soldering Flux and Solder

The first requirement for good soldering is that the surface of the two metals to be soldered together be perfectly clean. By "clean" is meant that the metal surface has been scraped to remove any insulation or foreign matter and the base metal exposed.

The second requirement is that a proper "flux" be used with the solder. The flux is a substance which is applied to the joint after it has been cleaned and is ready for soldering. The purpose of the flux is to dissolve the oxide film which forms on the surface of the cleaned metal due to its contact with the air. This film is extremely thin and is invisible to the naked eye, nevertheless it is sufficient to close the pores of the base metal being soldered, thus preventing the ready alloying of solder and base metal.

There are a number of different kinds of flux and the type to use will depend on the metal being soldered. For soldering brass or copper, rosin is a good flux and because of its non-corrosive and non-conducting properties is widely used for inside telephone work. Rosin flux is not suitable for soldering on iron, steel, or galvanized metals, and for these an acid flux is recommended.

Modern Type of Solder

In the early days it was necessary to apply flux and solder separately. In

Fig. 2. Use of ladder for reaching splices in the spans.

recent years, however, practically all soldering around a telephone plant, with the possible exception of that necessary in connection with lead cable work, is now done with wire or ribbon solder having a hollow core which contains the flux. See Fig. 1. Self fluxing solder is very convenient to use and results in neater and more satisfactory work. The solder itself usually consists of 50% lead and 50% tin and will melt

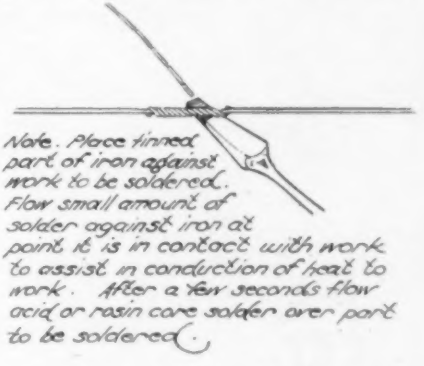

Note. Place tinned part of iron against work to be soldered. Flow small amount of solder against iron at point it is in contact with work to assist in conduction of heat to work. After a few seconds flow acid or resin core solder over part to be soldered.

Fig. 3. Soldering Theory.

around 415° Fahrenheit. For telephone exchange use it is best purchased in five pound rolls.

Economy of Line Wire Soldering

High resistance joints in rural and toll open wire plant has always been one of the most common causes of poor service. Especially is this true with the smaller single unit companies where non-standard construction methods have been used. The writer knows of a number of small companies who have spent considerable money rebuilding pole lines, trimming trees, and pulling slack in an effort to improve transmission on rural lines, only to discover that transmission is as bad or worse when they were through than when they started.

Good transmission, as far as line wires are concerned, is primarily a matter of conductivity. If the line wire splices and jumper connections are kept in first class electrical condition then transmission practically equal to that obtainable with new wire may be expected even though the wire itself may be somewhat rusted.

While it is natural to assume that a telephone line on good poles with good tree clearance and slack all pulled will give better transmission service than one in which the wire appears to be festooned between poles, and where the trees help support the wire, however if in the latter case the line wire splices

are soldered, and in the first case they are not, the chances are in favor of the latter furnishing the best service.

The economy of continuing old wire in service by soldering all splices as against replacing with new wire is a much argued point. For the smaller single unit companies there is but little question in the writer's mind but that open wire plant, where splices are of the "hand made" variety, can profitably

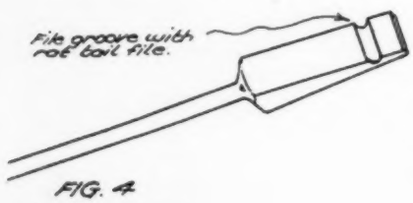


FIG. 4
4 LB COPPER WITH SPECIAL GROOVE FOR LINE WIRE SOLDERING

and economically be overhauled by soldering all doubtful joints.

The new "derrick" platforms which permit a man to be swung out among the wires in the middle of a span will undoubtedly make it possible for even the larger companies to overhaul old iron wire plant and solder all joints much more economically than they can replace the wire. The number of splices per span will, of course, determine the economy of overhauling vs. replacement.

For wire that has been badly wrecked by storms and which has several splices in each span, replacement may be cheaper than soldering but for the number of splices encountered in the average rural plant, soldering can be depended on to restore transmission to approximately the same as would be obtained with new wire, and at a small fraction of the cost of new wire.

Method of Soldering Line Wire Splices

The principle problem in connection with a program to solder all open wire line splices, is "how to to get to the splice". In one and two wire leads it is, of course, possible to untie the line wires and lower then to the ground where they can easily be soldered, but in multi-wire leads such a course is impractical. A method which is quite practical involves the use of two light 16 to 20 foot ladders arranged as shown in Fig. 2. The ladders should be bolted together at the tops and a light rope used to prevent the bottom from spreading. A helper should always be available to keep the ladder from tipping. One man and helper can cover a large amount of line in a day using this method. Spans having more than three splices had best be replaced with new wire.

Spans which are slack and ties in poor condition should be untied and soldered on the ground, after which slack should be pulled.

Companies with trucks equipped with derrick "Crow's Nests" can on many leads drive along the road with a man on the derrick platform and proceed rapidly from one span to the next without the necessity of settting up at each span.

For soldering purposes either a presto-lite gas soldering iron, or several heavy soldering coppers heated on a gasoline furnace carried in the truck should be used. Fig. 5 illustrates a small portable soldering outfit now available which utilizes presto-lite gas.

Kester acid core solder is recommended as the proper solder to use. With this solder splices will require a minimum of cleaning and the solder will unite readily with iron or galvanized wire.

The splice should be brushed with a small wire brush prior to soldering and then a well tinned iron held against the side or bottom of the splice at the same time running a small amount of solder against the tinned side of the iron near the point where it is in contact with the splice. After the iron has been allowed to heat the splice for a few seconds, then more solder should be run between iron and splice at the same time rubbing the iron back and forth on the splice on both sides, bottom and top to insure that solder flows evenly throughout the twists. The iron should be just below a red heat for best results. Fig. 3 illustrates the method described. Some companies make use of an iron with a round notch filed in the end as shown in Fig. 4.

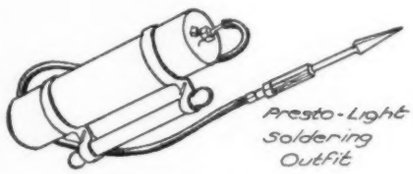


Fig. 5.

Hand made joints which do not appear mechanically strong should be cut out and the line sleeved. The ends of the line wire should be allowed to project through the sleeve and should be wrapped around the line wire several times and soldered at each end.

Existing iron sleeves which are of doubtful resistance should be bridged by means of a No. 14 iron wire with the two ends of the bridging wire wrapped several times around each line wire, and soldered. On existing sleeves where the wires project through far enough to permit soldering to the line wire, a bridging wire will not be required. Copper sleeves can best be soldered by filing a notch through the sleeve to the wire on the dead end side of the sleeve, and soldering with rosin core solder.

In the use of acid core solder for soldering splices in iron wire, it is good practice to carry a small bucket on the truck containing a saturated solution of ordinary baking soda, a rag kept moistened with this solution can be carried by the workman doing the soldering and should be wiped over each splice or joint after soldering. The baking soda neutralizes the acid flux left on the splice and wire, and at the same time the rag removes a scum left by the action of the flux on the wire.

Other Uses of Acid Core Solder in Outside Plant Work

Another valuable use of acid core solder in connection with outside plant work, is in the soldering of bronze, copper, copperclad, and other types of wire used between the cable terminal and iron line wires. It is very difficult to solder jumper wires to iron wires with rosin core solder and yet very simple with acid core solder. The same procedure for neutralizing the acid should be followed as explained for line wire splices.

Jumper connections are a prolific source of transmission trouble in any plant, and while test connectors are one method of eliminating "hand makeups," such connectors often work loose causing excessive transmission losses.

It is practically impossible to make a good tight electrical connection between a jumper wire (especially those other than copper) and a line wire due to the tendency of the jumper wire to spring away from the line wire after it is twisted up.

A soldered connection can be forgotten until it is necessary to replace the wire.

Connections between rural subscribers drop and open line wires should be soldered, thus insuring that transmission will be satisfactory through to the subscriber's telephone.

In closing I again wish to reiterate that acid core solder has a definite place in telephone plant maintenance, and need not be shied away from, because it is taboo for main frame, and most other inside C. O. E. work. It will make an easy job out of a hard job where iron, steel ,or galvanized metals are to be soldered. There is no danger of confusing the two types of solder as the acid core can be recognized by the "spitting" effect when touched to a hot iron.

A Manufacturer Relates Field Observations

In Which the Writer Describes the Reception Given a Manufacturer's Representative by a Wide Variety of Telephone Company Managers.

By H. A. WHITE
Kansas City Manager American Electric Company in an address before the telephone division of the Oklahoma Utilities Association, Tulsa, Oklahoma

In our travels as representatives of manufacturers we interview a great many people interested in the operation of telephone properties, also see many different kinds of installations and types of construction. From these contacts we form opinions based on a cross-section, rather than opinion based on separate cases.

As we all know, the telephone industry has changed form in the last few years. However, the job of giving a service worth while and collecting an adequate rate is still the basis for all calculations. There is a wide difference between over-built and properly built telephone plants, but the mistake of over-built is very few and far between. There is real demand for modern telephone service and the subscriber will pay for a service that to him is what he needs and gets returns for what he pays. None of us would be satisfied with an automobile manufactured even ten years ago, yet we expect a subscriber to like the service of telephones twenty or twenty-five years old, and operating on a line or system built at that time, and in many cases inadequately maintained or not maintained at all.

The successful merchant follows the trend of the times, both in manner of enticing customers to buy and in the kind of merchandise he places on his shelves. Then why not use the same logic in trying to sell your customers the kind of service he wants and ask him to pay you a fair price for what he wants. He will do that with more grace than he will pay much less for what he doesn't want, but has to take. True, you cannot please the whim of every subscriber, but there are certain standard improvements developed by public demand that are not whims or fads.

The manager of an exchange has a bigger job than just seeing that every case of trouble is cleared right away, or that his collections are 100% in the company's bank. He should be interested in things that benefit his community and should take time to know his customers. By knowing your customers and being one of the leaders of your community you will be in better position to know what your subscriber wants, and if you have built up confidence in your customers they will be less likely to oppose you on a necessary increase in rates when needed.

In years gone by the average telephone man thought a town had to have at least one thousand subscribers to enjoy common battery telephone service, but this has been changed by the subscriber wanting service like his neighbor and willing to pay for this service. Can sight you to common battery exchanges with less than two hundred lines now in successful operation.

Magneto service is fast becoming obsolete, just as did the old horse-drawn family carriage.

Each manager of a single exchange or group of exchanges should study his properties by consulting his subscriber and deciding whether to ultimately install common battery or automatic, both of which are present day systems.

These remarks may be construed to mean a salesman wants to sell new equipment, but I would rather have a successful magneto customer than an unsuccessful common battery customer.

Getting this view of the situation from some ten states as a whole, I am trying to pass on the thought to you.

Every salesman that calls on you has a lot of valuable information gathered from his contact with many different conditions and operating men. Ask him about the problem you have,—he will know how it is being done in other places.

This brings to mind a specific case that happened to one of our salesmen recently in a Kansas town. He made his first trip to see this particular manager. This man did not ask the salesman to sit down but showed his annoyance in every way. One good result he got from the salesman's visit was that he re-arranged all the papers on his desk and, from what the salesman said, it improved the appearance of the desk. The salesman, knowing he was not wanted, excused himself and the manager followed him to the door. The salesman was just clear of the door when it was slammed and locked. Knowing this fellow as I do he is the type that could well listen to some one who could advise him, for his property is in such a condition that it can not pay. The point I wish to stress is that the manufacturer must get information on what the operating company wants from the operators and the telephone companies must rely on the interest doing the manufacturing to supply this need. In other words they can help each other.

The independent manufacturers and operators are closely allied and I don't think any present day manufacturer would willingly give you wrong information on what would be best to do. The thing I have tried to bring out is that there is a strong demand for a high class service, the subscriber as a whole willing to pay, and the stockholders can, by proper management and investment, make a better return on the money invested.

Money properly invested in well managed properties will pay returns. Deal fairly with your subscriber, the regulatory bodies under which you operate, and your stockholders.

ELECTRICAL MEN VIEW NEW PHONE SYSTEM

An inspection of the new automatic equipment and a technical explanation of its operation was the chief feature of the first fall meeting of the local section of the American Institute of Electrical Engineers at the Southwestern Telephone company's new building in San Antonio, Texas, recently. About 100 engineers attended, among which were 30 members of the student branch of the institute at the University of Texas. B. D. Hull, chief engineer of the telephone company from Dallas, and a director of the A. I. E. E. explained the operation of the automatic equipment. V. H. Braunig, vice chairman of the local section, was in charge of the program. Local engineers were invited to attend.

NEW PHONE EQUIPMENT NEARLY $7,000

According to estimates of the engineering department of the Mountain States Tel. & Tel. Company, Gillette, Wyoming, the cost of the equipment for the new exchange amounted to $6,902.00.

The Latest Telephone Apparatus Patents

A Description of Outstanding Patented Inventions on Telephone, Amplifying and Acoustics as They are Granted by the United States Patent Office. This information Will be Found a Handy Reference for Inventors, Engineers and Plant Men in Establishing Dates of Record, Etc.

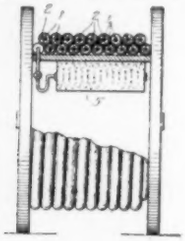
Conducted by

BEN. J. CHROMY

Patent Attorney

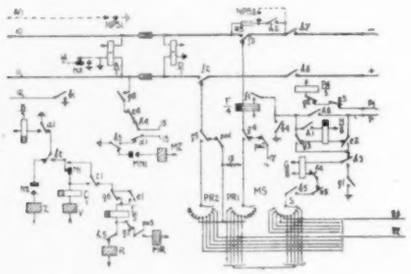
Washington, D. C.

1,872,818. IMPREGNATED PAPER INSULATED, LEAD COVERED CABLE. Denney W. Roper, Chicago, Ill. Filed June 1, 1931. Serial No. 541,137. 3 Claims. (Cl. 173—264.)



1. A high voltage cable including an oily impregnating dielectric having dispersed throughout a substantial amount of entrained inert gas which is devoid of free oxygen and which is slightly soluble in the impregnating dielectric.

1,872,720. TELEPHONE SYSTEM. Alfred Edward Flenley, Liverpool, England, assignor to Associated Telephone & Telegraph Company, Chicago, Ill., a Corporation of Delaware. Filed Aug. 8, 1930, Serial No. 473,866, and in Great Britain Aug. 9, 1929. 11 Claims. (Cl. 179—18.)



1. In a telephone system an automatic numerical switch having access to different classes of lines, means for operating said switch responsive to a plurality of digits of a called telephone number of seize one of said lines, and means operated over a wiper of said switch only in case the seized line is of a particular one of said classes for preparing said switch to respond to a further digit.

1,873,477. COAXIAL CONDUCTOR TRANSMISSION LINE. Donald A. Quarles, Englewood, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a Corporation of New York. Filed March 30, 1929. Serial No. 351,304. 14 Claims. (Cl. 173—265.)

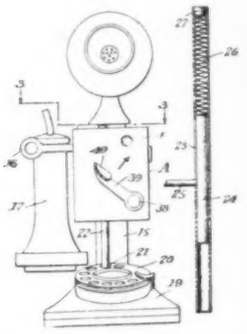
1. A transmission line comprising inner and outer coaxial conductors, the outer conductor comprising braided strands of metal and means partly braided with said strands for supporting one of said conductors from the other.

1,873,470. CABLE ARMOR. Robert L. Peek, Jr., Elizabeth and Claude L. Hippensteel Bloomfield N. J., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a Corporation of New York. Filed April 13, 1929. Serial No. 354,791. 9 Claims. (Cl. 173—266.)

1. A wire having a central core of an alloy of aluminum with at least one of the metals, copper, silicon, manganese and magnesium and having a surface coating of different metal non-corrosive in sea water.

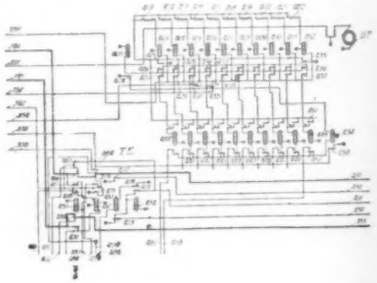
1,874,486. COIN-CONTROL DEVICE. Ray M. Fox, Los Angeles, Calif. assignor, by direct and mesne assignments, to Edward T. Monett, New York, N. Y. Filed August 27, 1926. Serial No. 131,979. 4 Claims. (Cl. 194—61.)

1. In combination with a dial-actuated telephone instrument, a lock bolt for engaging and locking the dial of said instrument when the line circuit is open, a trigger for engaging said bolt to maintain the bolt in dial locking position, a coin-receiving member, means for manually actuating said coin receiving member, means connected to



said coin-receiving member to actuate said lock bolt to release the same from the dial when said coin-receiving member is manually actuated.

1,870,621. AUTOMATIC TELEPHONE SYSTEM. John E. Gardner, Clarendon Hills, Ill. Filed Nov. 21, 1927. Serial No. 234,752. Renewed January 14, 1932. 13 Claims. (Cl. 179—18.)

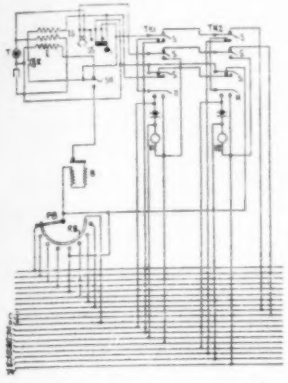


3. In an automatic telephone system, a plurality of trunks, a separate group of switches terminating each of said trunks, and digit responsive control mechanism common to all of said switches for controlling any one of said switches independently of the rest.

1,870,471. TELEPHONE SYSTEM. Rudolph Frank Stehlik, Chicago, Ill., assignor to Associated Telephone & Telegraph Company Chicago, Ill. Filed November 1, 1930, Serial No. 492,837, and in Great Britain November 5, 1929. 8 Claims. (Cl. 179—27.)

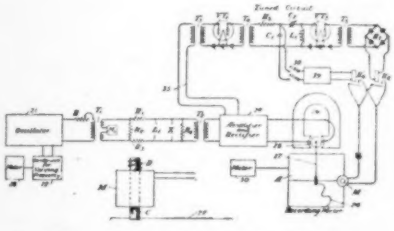
1. In combination with a telephone instrument of multi-station intercommunicating system normally connected for the extension of calls over such system, a manually operable element for selecting and signalling any other

station of the system over a single wire speaking circuit, a two-wire trunk having a branch terminating in said tele-



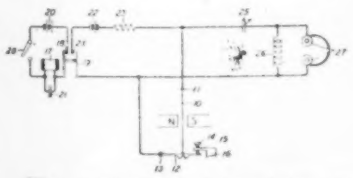
phone, and manually operable means for interrupting the normal connections to said telephone and for connecting the same to said trunk line.

1,871,944. TRANSMISSION MEASURING SYSTEM. Fred H. Best, Westfield, N. J., assignor to American Telephone and Telegraph Company, a Corporation of New York. Filed January 14, 1932. Serial No. 586,647. 5 Claims. (Cl. 234—5.5.)



1. The method of measuring transmission through a transducer at various frequencies, which consists in applying currents of those frequencies to the transducer in order, measuring the output from the transducer, recording the measurements by the adjustment of a measuring index across a moving record sheet and also applying a particular frequency narrowly selected to make a record mark on said sheet whereby a frequency scale may be established along said sheet.

1,869,884. TESTING DEVICE. Austen M. Curtis, East Orange, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a Corporation of New York. Filed July 9, 1930. Serial No. 466,732. 7 Claims. (Cl. 175—183.)



1. The method of determining the stress in a member under tension which consists in vibrating said member in a constant magnetic field to generate an alternating E. M. F., transmitting certain frequencies while suppressing all other frequencies of said E. M. F., translating the transmitted frequencies into a musical note and comparing said note with a musical note of a given frequency.

Book Review

ELECTRONICS, by Ralph G. Hudson. 135 pages, 45 figures, cloth binding. Price, $2.00.

Because of the increasingly important role which the science of electronics is playing in telephony and allied arts, the engineer can well afford to become better acquainted with the fundamental laws that are responsible for the operation of his vacuum tubes, neon tubes and other devices. **Electronics** (which has no connection with the magazine of the same name) is a book that tells what makes the wheels go 'round in the world of molecules, atoms and electrons, in language that even the non-technical man can digest. It is a summation of the modern theories and applications of electronics, intended especially for the man who has neglected to keep abreast of this field. Avoiding nearly all of the usual mathematical proof and argument, the author explains these phenomena from the purely physical viewpoint. The result is an interesting and very readable book.

The first part is devoted to a historical resume of the subject, showing its development from early conceptions of electricity and matter through the experimental evidence which has led to the present-day theories. The contributions of Dalton, Franklin, Stoney, Crookes, Perrin, Thomson, Rutherford, Faraday, Einstein, Millikan and others to these theories are discussed, with descriptions of some of the more important experiments, such as Thomson's measurements of electron velocities and the ratio of e/m, and Millikan's famous oil-drop experiment. The properties of electrons and protons in the light of the most widely accepted evidence are summarized.

Rutherford's and Bohr's atomic models and the quantum theory are discussed, as well as radiation from orbital electrons and the new wave theories of matter. Next the functioning of these theoretical laws in the conduction of electricity through gases, liquids, solids and vacua, the phenomena of radiation, and thermionic and photoelectric emission of electrons are considered.

The latter sections of the book are given, in turn, to explanations of the operation of practical electronic devices, including two-, three-, four- and five-element vacuum tubes; mercury vapor, gas tube, electrolytic, vacuum tube, mercury arc and copper oxide rectifiers; thyratron tubes and photoelectric cells. Commercial uses of these devices in talking picture systems, television, sound reading for the blind and wire transmission of pictures are described.

Three appropriate tables at the end give the atomic constants of the elements, conversion factors for the several systems of electrical units, and various important constants of atoms and electrons. The author, professor of electrical engineering at Massachusetts Institute of Technology, is well known to engineers for his manuals of engineering and mathematics.

W. F. Lanterman, Transmission Engineer, N. B. C., Chicago

WESTERN ELECTRIC EXECUTIVE PASSES AWAY

William Anderson, for five years assistant Treasurer of the Western Electric Company at 195 Broadway, New York, passed away September 12, at his home, 32 Winans Street, East Orange, New Jersey.

Mr. Anderson was 56 years old. He was born in Yorkshire, England, and educated in the public and private schools in that country. He had been connected with the Bell telephone system for 37 years, having started as a stenographic and confidential clerk with the American Bell Telephone Company in Boston in 1895.

In 1910 he became secretary to Charles G. DuBois, who was then comptroller of the American Telephone and Telegraph Company in New York. When Mr. DuBois became president of the Western Electric Company in 1919, Mr. Anderson continued as his secretary.

Mr. Anderson was a 32nd degree Mason and past commander of Jersey Commandery No. 19 in East Orange. He was a member of the Telephone Pioneers of America and of the New York Credit Men's Association.

He is survived by his wife and two sons.

ACQUIRES PHONE FIRMS

The New York Telephone company was authorized by the Interstate Commerce commission to acquire the Galway Telephone company, Saratoga county, N. Y., with about 200 stations at $10,000, and the North Country Telephone and Telegraph company in Jefferson county, N. Y., with 217 stations at $13,000.

Making Successful Test Pole Connections

Practical Discussion of Reducing Trouble in Test Pole Connections—Method of Dead-Ending Wire—Clamping Devices—Soldering Suggestions

By T. DeWITT TALMAGE
Transmission Engineer
Illinois Telephone Assn.
Springfield, Ill.

The management of telephone companies, more now than ever before, is carefully scrutinizing each item of expense that is incurred in maintaining the telephone plant in serviceable condition. Money for ordinary repairs is taken from the current earnings of the company, and, all other things being equal, a reduction in the amount of cost of ordinary repairs results in a greater net profit. In consequence, the causes of excessive maintenance costs are being thoughtfully analyzed and reduced wherever possible.

Ordinary repair expense includes, among other things, the cost of testing for, locating, and clearing crosses, breaks, grounds, and other line troubles, including routine work intended to prevent such troubles, as, for example, pulling up slack, tightening guys and resetting guy stubs, trimming trees, straightening poles and crossarms, and cleaning and adjusting apparatus.

Economical plant operation demands that there be a high degree of cooperation between the engineers, construction forces and maintenance people. Such teamwork will materially assist in determining where maintenance costs may best be reduced.

A very helpful method of cooperation used in many organizations is the "suggestion box" for collecting ideas from employes for better methods. This scheme is nothing more or less than an organized plan for encouraging employes to make recommendations for improvements and changes which will result in greater efficiency and better service to the customers. In telephone organizations the maintenance people, because they are in intimate touch with the plant, can be of incalculable value to such a cooperative program by reporting undesirable plant conditions. Such reports might even include constructive suggestions for ways and means of improvement which would result in lowered maintenance charges.

The importance of an improvement cannot always be judged from its size. Many relatively small items in a telephone plant are capable of producing some of the most annoying troubles. An example of this fact is an improperly made test connection.

Test Connection Defined

It has been the practice of some companies to establish test points in toll and tributary circuits for the purpose of facilitating testing routines. Especially is this practice common on joint owned circuits. By a test pole connection on a joint-owned circuit is meant that the line wire is cut and dead-ended at the junction pole or division of ownership point and the circuit connected through by clamping the ends of the wires together with an approved test connector. Such a test connection permits the testman to readily open the circuit when making his tests without the necessity of cutting the wire.

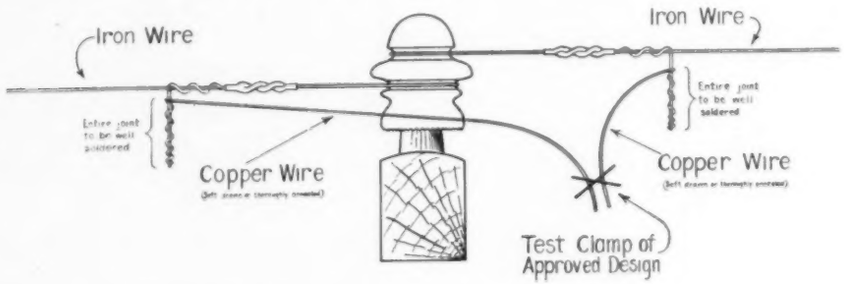


Fig. 1. Method of making test connection in iron wire.

Poorly made connections at test points are frequently a source of trouble. However, it is not fair to condemn the entire practice of making test connections just on the strength of the few that serve as "horrible examples" because they were improperly made. Conservative conclusions should not be drawn too hastily from either a single instance or from a relatively few samples. Nevertheless, an analysis of troubles caused by slipshod test connections brings out some very interesting considerations which must be kept in mind when making a test point that is designed to serve as well or better than any other joint in the circuit.

In analyzing the various troubles which may creep into test connections it seems that cutouts, high resistance contacts, and unbalanced conditions are more prevalent in galvanized iron wire circuits than in any other kind of wire. Galvanized iron test connectors are used in clamping galvanized iron wire at test points. It is generally understood that the contact surface of the wire and clamp must be clean but caution should be observed in the cleaning process so as not to injure the galvanizing.

Some cases of trouble in iron wire test connections have been traced to the over-zealous lineman who used coarse emery cloth so vigorously that the zinc galvanizing was entirely removed and the iron itself was exposed to the destructive corrosive action of moisture and gases. But probably the uninitiated lineman who makes no effort at all to clean the wire causes more trouble. Another very common cause of trouble in this class test connection is the use of the wrong type of clamp or a poorly designed clamp. The practically fool-proof method used by one company to solve this vexing problem will be described in this discussion.

Clamping Devices

Copper wire test connections properly clamped together with a device of an efficient type, such as a slotted bolt made of brass or some other metal or alloy closely associated in the electrochemical table with copper, are ordinarily trouble free provided that the contact surface of the wire and bolt has been thoroughly cleaned before the clamping bolt was tightened up. It is quite important that the portion of the copper wire in the clamp be clean (new wire as well as old, as the new wire is shipped with a lubricant on it). This cleaning may be done by rubbing the wire thoroughly with fine emery cloth (No. 000) until all traces of tarnish, corrosion, grease or other foreign matter has been removed. The brightened surface of the copper wire should then be wiped with the cloth side of the emery cloth until the emery dust is entirely removed.

Ordinarily, more thought is given to

connections in which wires of two different metals are clamped together because of the possibility of galvanic action. With this thought in mind some telephone men have utilized clamps with special washers, trick clamping devices and other unusual features with varying degrees of success. While some of these efforts contain considerable merit, others do not possess much practical value. The method which will be described in this article to reduce trouble in test connections of two iron wires is also applicable to wire connections involving two different kinds of metal.

There are several different styles and types of clamping devices on the market. Each has some feature which distinguishes it from the others. There are slotted bolt clamps, wing-nut clamps, wing-screw clamps, and several variations of the single and double bolt clamp. For most connections the slotted bolt clamp will be found satisfactory. Where there is considerable vibration or strain encountered some type of double bolt clamp may be advisable to provide sufficient clamping surface so as to reduce the possibility of crystallization and to provide necessary holding power in the case of strains. However, it is not wise to subject test connections to excessive vibration or strain.

Dead-Ending Wires

The wires may be dead-ended either on strain insulators located about 2 feet from the crossarm or on one-piece transposition insulators. High-grade circuits are usually dead-ended at test points on break irons fitted with steel pins. The wire is dead-ended as shown in Fig. 1 by using a half sleeve the same size as the wire. The half sleeve is given 3 half turns with standard connectors or other approved tools, care being taken not to nick or injure the wire. The distance of the sleeve from the insulator is usually between 3 and 4 inches. Ordinarily, where circuits are broken for test purposes, the wires should be dead-ended in the same manner as for wires terminating in both directions at intermediate terminal poles.

Fig. 1 shows the method of making a test point in an iron wire circuit that is remarkably free from the troubles experienced in the usual iron wire test connection. In this test point the iron wire has been dead-ended in the regular manner, the end of the wire has been given several loose turns around the conductor beyond the sleeve, and a 3-inch tip or "pigtail" is turned down at right angles to the line wire as shown. A piece of soft drawn or thoroughly annealed (softened) copper wire, such as ordinary copper tie wire, is then soldered to the iron wire pigtail as the diagram indicates. The ends of the copper wires are then cleaned and burnished with fine emery cloth (No. 000) and inserted in a slotted brass bolt connector. Enough slack is taken up in the copper wires to prevent the wire from touching the crossarm and then the bolt is well tightened. Such a test connection has all the advantages of any copper-to-copper connection and is an improvement over the ordinary iron wire test connection.

It is still easier to apply this type of test connection construction in the case of two wires of different kinds of metal, for instance, copper wire and iron wire. The copper wire would be dead-ended in the usual manner, the end given several loose turns around the conductor beyond the half sleeve and then bent over the insulator to reach to the short piece of copper wire which would be soldered to the 3-inch iron wire pigtail just as shown in the right half of Fig. 1. The slotted brass bolt with two copper washers could then be used to clamp the ends of the two copper wires together as shown in Fig. 2.

It should be noted that in actual practice the extreme ends of the copper

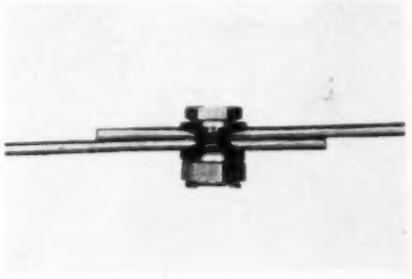


Fig. 2. Photo of slotted-bolt test connector clamping together two soft copper wires.

wires would not be bent down so decidedly as the sketch in Fig. 1 indicates, but rather the two wires would be placed in more of a straight line and the overlapping at the clamp would then be in more of a parallel layout as shown in Fig. 2.

The two washers shown in Fig. 2 have a rounded groove next to the wire which closely fits the curvature of the conductors. This construction provides a greater contact surface at this point than the plain flat washer. Another practice which is aimed at making a better electrical connection at test points is to file a flat side on the two copper wires throughout the overlapping section where they come in contact with each other. This increases the actual contact surface between the two wires.

The clamp shown in Fig. 2 may be used without the washer at the top of the connector (under the head of the bolt), although its use serves to distribute the pressure over a longer length of the conductors. The washer at the bottom of the connector is necessary to prevent injuring the wire when the nut is screwed tight. In the particular clamp shown in Fig. 2 the washers are of the tongued type and entirely surround the slotted bolt. This type of construction increases the contact area between the wires and the slotted-bolt connector. The lower tongued washer serves an additional purpose in preventing the sides of the bolt from collapsing and permits the wires to be meshed into intimate contact under high pressure.

Location of Clamps

Referring again to Fig. 1 it will be seen that the clamping device is not located at the exact center of the connection but rather is placed approximately halfway between the insulator and one of the iron wire pigtails. This method of construction gives rise to a long copper wire tail and a short copper wire tail. Where the test point is to be used for testing in one direction only, the long copper wire tails should be made a part of the section over which the tests are conducted. However, where it is planned to test in both directions it will be found convenient to stagger the long tails so that one long wire appears on each circuit on each side of the crossarm. This arrangement would result in the odd numbered wires having long tails and the even numbered wires, on the same side of the crossarm, having short tails. This staggered location of the long tails, together with the inherent flexibility of annealed copper wire, permits the testman to use the long tail itself in placing a short-circuit across any particular pair of conductors.

When wires are taken out of test connectors or clamps both the wire and the clamping surface of the connector should be thoroughly cleaned and burnished with fine emery cloth (No. 000) before replacing.

There is a possibility that under abnormal conditions, such as severe vibration, heavy vertical loading or other strains, or rough treatment by careless linemen, the iron wire pigtail may be damaged. This is not a serious mishap because the copper wire may then be soldered to the line wire itself, preferably between the half sleeve and the insulator on the dead-end side of the loop around the insulator. It is not good practice to install test points where there is any possibility of the connection being forced to withstand unusual conditions. If test points must be installed under such adverse conditions the construction employed should be in accordance with the special requirements which must be met.

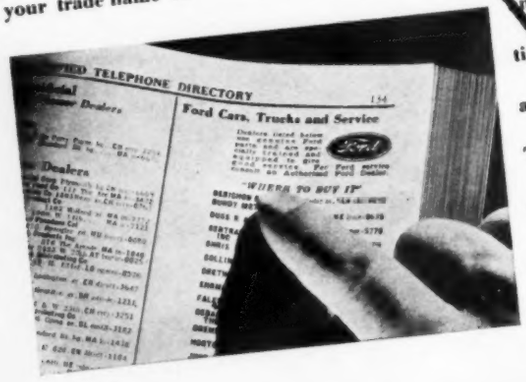
(*Continued on page* 22)

TELLING BUSINES

It directs prospects to your nearest Authorized Dealer

"WHERE TO BUY IT" MAKES ADVERTISING RESULTS MORE CERTAIN . . . CHECKS SUBSTITUTION AT THE POINT OF SALE

What profiteth it a manufacturer to have people want his product . . . if they don't know "where to buy it"? ¶ You run no such risks when your authorized dealers or service stations are listed under your trade name in "Where to Buy It"—in the classified telephone books. Then prospects can easily find and quickly locate your nearest outlet. ¶ Investigate this modern merchandising service. Ask your advertising or sales counsel. Or write or telephone: Trade Mark Service Manager, American Telephone and Telegraph Co., 195 Broadway, New York (EXchange 3-9800) — or 208 West Washington Street, Chicago (OFFicial 9300).



WHY TO BUY "WHERE TO BUY IT" SERVICE

UNDER present-day conditions, anything that facilitates the sale of goods or services is of special interest to merchandising executives.

Through the publication of advertisements similar to the one reproduced on the opposite page in a list of business and trade periodicals, sales and advertising executives and manufacturers are being told of the advantages of the "Where to Buy It" feature of the classified telephone directory.

In particular the copy stresses the importance—especially to the distributor of a nationally advertised product or service—of being able to direct prospective buyers to authorized local dealers and service stations. Each advertisement shows the familiar yellow pages of the classified directory and usually focuses attention on a specific trade mark heading.

This advertising, seen by thousands of men interested in sales and distribution, should be an influence for the greater use of the classified section of telephone directories everywhere.

AN ADVERTISEMENT OF THE

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

MAKING SUCCESSFUL TEST POLE CONNECTIONS

(*Continued from page* 19)

When making the soldered connection between the copper wire and the iron wire pigtail, both wires should be well cleaned and burnished first. In wrapping the copper wire around the iron wire sufficient space should be left between adjacent turns of the wire to permit entrance of the molten solder. The wrapped joint should be made mechanically secure as well as electrically conductive because any movement of the joint during the cooling of the solder disturbs the crystallization of the solder and prevents the complete union of the two wires.

The wrapped joint may then be heated with a gasoline blow torch or an acetylene gas torch. The most common mistake made in soldering is that the metals are not heated sufficiently to allow the solder to really alloy or combine with the metals being soldered together. To solder successfully the wires must be heated to a temperature sufficient to melt the solder freely. Only when the wires have absorbed the necessary heat to permit the solder to actually fuse with the surface of the wires can a properly soldered electrical connection be made.

For soldering connections of this type standard acid-core wire solder is generally used. After soldering the joint it is suggested that the flux residue be removed by washing the soldered connection with a rag or sponge saturated with water. This cleaning process removes all traces of fused chlorides which may be present and prevents any harmful corrosive formations.

Some linemen use a slightly different method of making soldered connections, especially where the joint is a part of a high-grade or important circuit. This method requires that the iron wire pigtails and the copper wire tips be "tinned" **before** the wrapped joint is made. By "tinned" is meant that the wires are coated with a thin film of solder. The copper wires are tinned for a distance of about 5 inches on one end and the iron wire pigtails are tinned throughout the entire 3-inch length of the tip. The tinned copper wire is wrapped tightly around the tinned iron wire pigtail and it is then quite an easy job to solder-bond the two tinned wires together and secure a strong, well-soldered connection.

To check the strength of the soldered connection it is only necessary to apply a reasonable force or pressure with the fingers, without the use of any tool, to the joint. If there is any weakness in the connection it will usually develop itself under this treatment so as to be detected. Caution, however, should be observed in the mechanical testing of such joints in order to guard against forcibly disturbing the mechanical stability of the job.

So far as actual construction features are concerned, it is just as important and necessary that the smaller construction jobs be executed in the same efficient manner that the larger jobs are handled. The life of any plant is largely dependent upon the kind of workmanship during construction, and careful attention to the fundamental principles involved will result in eliminating many unnecessary repair trips. This, in turn, will make available more time for employes to do other work—such as selling additional telephone service.

BEAVER VALLEY COMPANY CHANGES HANDS

The Beaver Valley Telephone Company, McCook, Nebr., has been purchased by the Northwestern Bell Telephone Company, and possession was given September 25th. The negotiations were completed June 14, 1932, the consideration being $25,000. The transaction was approved at a late meeting of the interstate commerce commission.

The valley phone company has been operating in Marion, Danbury, Lebanon and surrounding territory, since 1902.

F. E. Hamilton manager of the local exchange and C. A. Stroup auditor for the Northwestern Bell Company, were in Danbury recently making arrangements for the transfer.

'PHONE EMPLOYES HOLD FALL SESSION

The employes of the Bell Telephone Co., of Upper Darby, Pennsylvania, held their annual fall meeting recently at the craftsman's Club, Drexel Hill.

They were addressed by Mr. E. M. Prisk, vice-president and general manager of the eastern area. Mr. Prisk discussed operating results for the year and the objectives for the fall months.

Other speakers included W. A. Eipper, general plant manager; G. Thomas Cartier, general traffic manager, and J. B. Wittan, general commercial manager.

H. J. Belden, district sales manager of the Upper Darby district, presided as chairman. There were 400 in attendance.

BELL REPRESENTATIVE ADDRESSES CLUB

Members of the Kiwanis club, Madison, Indiana, were entertained with an interesting program by Emmett Belser, of Indianapolis, who is a representative of the Bell Telephone company.

Mr. Belser, beginning with a talk and motion picture on the moving of the Bell telephone plant at Indianapolis and continued by showing a replica of the first telephone invented by Alexander Bell, describing how it was used 57 years ago.

His next subject was long distance talking, explaining and showing by motion pictures how conversation is carried on between San Francisco and Sidney, Australia.

How new inventions carry sound 160,000 miles by amplifiers the same as in radio, was explained by the speaker. He explained also how photographs are sent all over the world in a few seconds, how they are made and received.

National chain hook-ups for broadcasting were explained. How a speaker in Madison could have his voice heard over the world a fraction of a second before the audience in the room with him could hear him, was an interesting explanation.

Numerous other demonstrations showing the latest developments in telephone improvements had a part in his talk, all of which were quite interesting. The speaker was procured by Herbert Metzger, chairman of the publicity committee.

FIVE-DAY WEEK FOR SOUTHWESTERN BELL EMPLOYEES

With 4000 employes at work on a five-day basis and drawing the same salary per hour as formerly, the Southwestern Bell Telephone Company, Oklahoma City, Okla., considers its rotation work plan a success.

M. J. Stooker, state manager for the company, said the adoption of the plan has saved the jobs of 800 employes in Oklahoma. Not a single complaint has been received from any employe.

PHONE ANSWERING SERVICE ENLARGED

The opening of a branch office at 3008 E. Grand Blvd., Detroit, Michigan, has been announced by the Telephone Message Exchange, with main offices at 1214 Griswold St.

This new exchange will answer telephones for subscribers at any time, day or night, when their phones are unattended. This is accomplished either by a direct wire connection or a two-number listing. The second floor of the new exchange will be used as desk space and mailing address, with telephone service for manufacturers' agents and others who do not maintain their own offices.

Telephone Activities in Foreign Countries

Dispatches from Abroad Keep Telephone Men in United States Constantly Informed Concerning Telephony of the World; Domestic Telephone Problems Oftentimes Can Be at Least Partially Solved by Watching the Outcome of Experiments Made Elsewhere

First Wireless Station for the Holy City of Mecca

The holy city of Mecca is among the centers at which wireless stations have just been erected by the order of King Ibn Saud of the Hedjaz-Nejd. The work was begun about two years ago, when the King asked the Marconi Company to erect a number of stations in his country. The company had to find a competent Egyptian Moslem engineer and train him in the art of erecting wireless stations. He has now returned to Egypt after directing the erection of eight wireless stations, including one at Riad (the capital of Nejd) and one at Mecca. He will return in the autumn to complete the erection of the ninth station.

Teleprinter Service Inaugurated in London

A teleprinter service has been opened in London recently. The teleprinters will be worked over the public telephone exchange system, and will provide a local service in London which it is intended to extend gradually to provincial towns and to include a trunk service. It is hoped that very soon there will be teleprinter services in all the principal towns, with intercommunication between those towns and between other parts of the country according to the public demand. The rental for a teleprinter is 65 pounds, which covers cost of installation and maintenance by the Post Office. Subscribers to the exchange will pay the normal telephone or teleprinter call charges.

Polish Telephone Statistics

The following statistics give the telephone position in Poland for the last two years: the figures are provisional:

	1930	1931
Exchanges	2,875	2,975
Subscribers	145,000	155,000
Telephones	200,000	220,000

The working of the Polish trunk system is very satisfactory.

Telepicture Service in Australia

What is reported to be the first newspaper operated picture transmission service in the Southern Hemisphere was started on June 1, 1932, between the Herald in Melbourne, Victoria, and the Advertiser and the News in Adelaide, South Australia. So far, the service is being operated in one direction as the Herald in Melbourne is the only paper equipped with a transmitter, but a two way service is expected to be in operation in the near future.

Statistics for Brazilian Government Telegraph System

The Brazilian Telegraph Department recently furnished the following information:

	1929	1930	1931
Number of Telegrams—	6,015,050	5,537,311	9,106,902
Number of Words—	96,343,746	92,176,585	121,080,083
Revenue in Milreis—	33,823,358	31,385,413	31,504,315
Length of Wire in Meters—	58,947,978	57,618,080	57,798,080

The total number of Government owned telephones in 1931 was 680 with 936,832 meters of wire. The total number of telephones in Brazil amount to approximately 180,000.

Radiotelephone Service Between North America and Egypt

Radiotelephone service between North America and Egypt was opened to the public recently via London. The circuit distance from New York to Cairo is about 6,000 miles. Service at the Egyptian end embraces Cairo and Alexandria, the former having some 17,500 telephones and the latter about 11,600 instruments.

Trial Telephone Conversations Between Egypt and Germany

The agreement between the Egyptian Government and Marconi's Wireless Telegraph Company, Ltd., relative to the public telephone service between England and Egypt, inaugurated June 22nd, has been signed by the British Postmaster-General as third party. Trial conversations between Cairo and Berlin have taken place as a preliminary to the opening of a direct radiotelephone service between Egypt and Germany.

Radiotelephone Service Maintains Its Popularity in Netherland India

During May, 1932, there were 99 incoming conversations from Holland totalling 477 minutes and with returns amounting to $2,097.20. Outgoing conversations with the mother country totalled 138, amounted to 623 minutes, with returns of $3,463.60. Traffic with Germany during May shows one incoming conversation of six minutes. In the traffic with other countries via Holland, there were five outgoing conversations with Italy, three incoming from England, four outgoing to Belgium, one outgoing to Sweden, Denmark and France. These 15 conversations totalled 80 minutes, with the local service's share amounting to $67.60.

Radiotelephony in British Coal Mines

An ambitious scheme is being considered for wireless telephone communication all over the underground parts of two large Yorkshire coal mines. The pits concerned are the Manor Haigh and the Roundwood, in the Wakefield colliery area. It is claimed that if the experiments prove successful they will improve coal pit safety measures, for men in all parts of a mine can be warned instantly. The intention is to erect a transmitting and receiving station at the pithead of the Manor Haigh Colliery. Telephone receiving and transmitting sets will be assembled in all parts far underground and even extended to the Roundwood Colliery, which is linked to Manor Haigh by an underground roar. Test messages distributed from the central station at varying power will be picked up in the various parts of the workings and return messages received at the pithead station. The pithead aerial mast will be 35 feet high and a basic power of 0.25 kw will be used for the transmission.

Hawaiian Telephone System Shows Progress During 1931

Profitable operation, extensive improvements and alterations, a substantial increase in the number of subscribers and greater use of toll service during 1931 is shown in the annual report of the Mutual Telephone Co. The company now owns and operates 24,983 telephones, a gain of 664 over 1930. The number of toll messages was almost four per cent greater than 1930. Gross revenue amounted to $1,564,891. Net income was $320,045.

New Protection for Armour Packing Plants

All Properties of the Armour & Company, Great Meat Packers Have Contracted with the American District Telegraph Company for Central Station Protection

Sales Manager will say, what a "Sweet" contract that was—and it was. Purchasing Managers will say, what a "Relief" it must have been when that one was signed—and it was. A purchasing department in closing a transaction of that magnitude is confronted with a many sided engineering problem in which absolute dependable results are the controlling factor.

During the past quarter of a century there has been many Sprinkler Systems perfected to protect large manufacturing plants from fire, and likewise the same condition has applied to Alarm Systems to protect them against burglarly. To decide which system to have installed in all the Armour & Company's plants, we dare say was no small problem. Telephone Engineer and Staff Engineers are familiar with the circuits and equipments of the American District Telegraph Company; and we are sure Armour & Company will never have reason to regret having placed their business with them.

Very few telephone men realize the magnitude of present day development of both sprinkler and burglar alarm protection for industrial plants. The American District Telegraph Company alone has spent years of time, and money, in experimentation and development work, until now, they have perfected their circuits and apparatus to the point where damaging fires or burglaries on premises under their protection—just don't happen. Their years of experience, combined with the fine personnel of their Engineers; the proven fearlessness of their Guards and Runners, results in their installations being a real asset to any business house protected by them.

We are featuring the contract between the above companys in the protection of the properties listed below, as we feel the telephone industry should realize more and more the close interrelation between alarm companys and themselves, due to the revenues received from the leasing of wires and cable conductors. A revenue that has been steadily increasing as the alarm companys have been increasing their operations.

All of the extensive and valuable properties of Armour & Company, the great meat and provision packing concern, as well as the properties of all companies affiliated with the Armour corporation, have contracted for the American District Telegraph Company's central station protection. Each plant will have central station watchman's compulsory tour and manual fire alarm service, with central station sprinkler supervisory service in all sprinklered properties. There will be special automatic recording and transmitting facilities in certain locations.

The decision to employ the central station protection services of the American District Telegraph Company followed an exhaustive investigation of every available form of protection by the executives, fire prevention and insurance engineers, and other consultants of Armour & Company. The American District Telegraph Company's central station services were selected as affording the highest attainable degree of positive, efficient protection, at the lowest cost consistent with the high character of the protection.

The protection systems will be operated and maintained through the central stations of the American District Telegraph Company which are in cities where Armour & Company has plants. In all except two instances, entirely new apparatus will be installed; in the main plant at Chicago and the Kansas City plant, existing proprietary systems heretofore used for supervision of the sprinkler systems, will be converted for American District Telegraph central station supervision. The work of installation will keep many American District Telegraph employees busy for the next several weeks.

The contract provides protection for the following plants:

Proprietary systems to be converted for Central Station Supervision—Armour & Company, main plant, Chicago; Armour & Company, Kansas City.

Sprinkler Supervisory Service—Armour Glue Works, Chicago; Armour & Company, Denver; Armour & Company, East St. Louis; Armour & Company, Fort Worth; Armour & Company, Jersey City; Fowler Packing Company, Kansas City; Morris & Company, Oklahoma City; Armour & Company, Omaha; Armour & Company, St. Joseph; Armour & Company, Sioux City; Morris & Company, Chicago; Morris & Company, Omaha.

Night Watchman's Compulsory Tour and Manual Fire Alarm Service—Morris & Company, Chicago; Armour & Company, Chicago; Armour Glue Works, Chicago; Anglo-American, Chicago; Armour Car Shops, Chicago; Lookout Oil Refining, Chattanooga; Armour & Company, Denver; Armour & Company, East St. Louis; Morris & Company, East St. Louis; Cotton Oil Company, East St. Louis; Armour & Company, Fort Worth; Armour & Company, Indianapolis; Armour & Company, Jacksonville; Armour & Company, Jersey City; Armour Soap Works, Jersey City (Babbitt); Morris & Company, Kansas City; Armour & Company, Kansas City; Fowler Packing Company, Kansas City; Armour & Company, Memphis; F. C. Gross, Milwaukee; New York Butchers, New York City; Morris & Company, Oklahoma City; Armour & Company, Omaha; Morris & Company, Omaha; Armour & Company, Philadelphia; Armour & Company, St. Joseph; Armour & Company No. 2, St. Joseph; Armour & Company, Sioux City; Armour & Company, Spokane; Armour & Company, South St. Paul.

MANITOBA TELEPHONE PLANT READY TO SERVE

The new headquarters building of the Manitoba Telephone System, Winnipeg, Canada, has been formally opened by Hon. W. J. Major, K. C., Minister of Telephones for Manitoba, and is now in operation.

The new building, which is located on Portage avenue east, is a massive six-story structure of steel and concrete and is designed for a further nine stories. The building was designed by Alex Melville, architect and civil engineer, and A. B. Melville, inspector of work, and erected by the J. McDairmid Co., Ltd., general contractors, of Winnipeg.

The equipment in the new building, which is of the automatic type, was installed by Siemens Bros. (Canada) Ltd., and provides for 6,000 lines. This accommodation is on the second floor and expansion to 80,000 lines has been provided for. Commercial and accounting departments of the Government-owned system are on the main floor. Altogether the building is stated to be one of the finest of its kind on the American continent, and is equipped to handle all the demands of the service for years to come.

THE TECHNICAL CLEARING HOUSE

B. C. BURDEN, Editor

Artificial Cable Boxes and Variable Attenuators

Q.—What is meant by the term "artificial cable box," and how are these units used in connection with transmission testing work? Please give the values for the construction of one of these units.

A.—An artificial cable box is an arrangement of condensers and resistances which stimulate a variable number of miles of standard cable, and which is used in connection with transmission testing. The one most generally used consists of an arrangement of resistances and condensers having five networks which are equivalent to 1, 2, 4, 8, and 16 miles of standard cable.

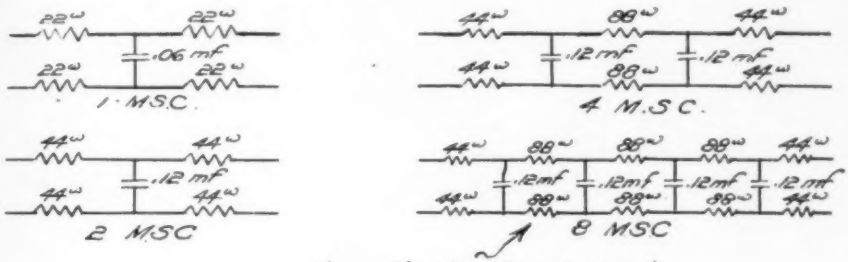


Fig. 1. Artificial cable networks.

These separate units are arranged so that they can be cut into the circuits by means of keys or small knife switches. With this type of artificial cable set, it is possible by throwing the proper keys to simulate the loss of from 1 to 30 miles of cable.

Figure 1 shows the value of each unit and Figure 2 the arrangement for cutting them into the circuit. Artificial cable boxes are rather difficult to build because of the necessity of getting condensers of exactly the right capacity value.

The artificial cable box has been replaced by the "non-distortionless variable attenuator" to a large extent. The chief difference between the variable attenuator and the old artificial cable box is in the use of simple non-inductive resistance networks in place of the resistance condenser networks used in the cable unit. Inasmuch as resistances can be easily wound to any desired value, anyone can construct a variable attenuator at a small cost. If resistances are non-inductively wound the unit can be used on any audio frequency and the calibration will still hold.

In the design of a resistance network there are two things that must be known, viz: the desired attenuation of the network in decibels, and the characteristic impedance of the lines into which the attenuator will be connected.

The first item is of course known, and the second will usually be 600 ohms for typical telephone circuits.

There are two types of resistance networks, and these are known as the

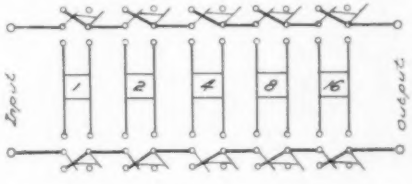


Fig. 2. Schematic wiring of artificial cable box.

"pi" and "H" types. The schematic arrangement of the resistances in each type is shown in Figure 3.

For most purposes the H type network is preferred.

The equations used to determine the resistances of an H type network are as follows:

where:

$$a = Z\left(\frac{1-n}{2(1+n)}\right)$$

$$b = Z\left(\frac{2n}{1-n^2}\right)$$

a = resistance of each of series arm
b = resistance of shunt arm
Z = characteristic impedance
n = current ratio

To illustrate the use of these equations in designing networks the computations involved in designing a one decibel—600 ohms network is given below:

$$a = 600\left[\frac{1-0.891}{2(1+0.891)}\right] = 17.28 \text{ ohms}$$

$$b = 600\left(\frac{2\times 0.891}{1-0.891^2}\right) = 5190 \text{ ohms}$$

The variable attenuator is made very much like the artificial cable box except that it consists of five separate H type networks having attenuation values of 1, 2, 4, 8, 16 decibels. These are arranged to be connected in the circuit as shown in Figure 2.

The values for each of these networks are as follows:

Loss in DB	Series Arm	Shunt Arm
1	17 ohms	5190 ohms
2	37	2500
4	68	1250
8	128	600
16	217	196

Resistance wire having a resistance of from 5 to 10 ohms per foot can be obtained from the telephone supply houses.

If an ohmmeter or Wheatstone Bridge is available anyone should be able to wind their own networks without any trouble. A small wood cabinet 5x410 inches is large enough to house the operating keys and the resistance networks. Terminals can be mounted on each end of the box making a nice looking and convenient test unit. Some of the applications of the variable attenuator are as follows:

1. As a variable network for use in the transmission test circuit described in a previous issue of Telephone Engineer.
2. As a variable network for determining the maximum loss through which various makes of subscribers telephones will give commercial transmission.
3. As a variable output control for use with line amplifiers in connection with program pickup work over telephone wires.
4. As a variable output control on 1000 cycle oscillators used in connection with transmission testing.

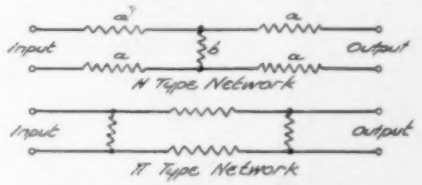


Fig. 3. H and pi type networks.

News From the Field

E. E. Boughton, former district commercial manager for the Ohio Bell Telephone Company, Cleveland, Ohio, has been installed as sales manager in the Akron offices of the company recently. Mr. Boughton replaces W. W. Anderson who died while in Camp Knox, Ky., a few months ago. The new Akron telephone official has been with the Bell Company for seven years and has been identified with the construction and commercial departments.

The Morrison Telephone Company, Fulton, Illinois, has placed an order for about 12,000 feet of cable, varying in size from twenty-five to four hundred pairs. This cable will be used in Fulton to replace the old cable. The purpose of this is to keep from interruption of service.

The Rio Grande Valley Telephone Company has begun construction work on a telephone system from Brownsville, Texas to Boca Chica.

There has been a substantial increase in the number of new telephone stations for the Southwestern Associated Telephone Company in Littlefield, Texas, since late August. September business showed a gain of 28 new stations, according to J. G. Singer, local manager. A new telephone directory for this district has been prepared and distributed. In addition to the Littlefield listings, the new directory includes exchanges at Amherst, Anton and Shallowater.

The name of the Toledo Telephone, Telegraph and Messenger Company, Toledo, Ohio, has been changed to the American District Telegraph Company.

Linemen for the Bell Telephone Company, at Williamsburg, Kansas, have begun work on the telephone lines and the placement of new poles.

The Lock Springs Telephone exchange, Gallatin, Missouri, has been purchased by Sam B. Cropper from C. E. Smith, and assumed control immediately. It is Mr. Cropper's intention to make extensive repairs to the system and will give 24-hour service to all patrons.

The stockholders of the Cooksville Telephone Company, Cooksville, Illinois, held their annual meeting recently. Therman Bliss and Fred Ehlers were elected directors, each to serve a full term.

Work on telephone lines belonging to the American Telephone Company, Lemont, Illinois, has been carried on, under the direction of Cecil Caryer, an official of that organization.

The new telephone lines to Nettleton, Missouri, have been installed, and the Nettleton subscribers were cut-over to the Hamilton, Missouri, switchboard. Hereafter Nettleton telephone users may be called by number (without calling Nettleton) the same as local subscribers.

A new direct telephone circuit between Las Cruces, New Mexico and Hot Springs, Ark., has been placed into service by the Mountain States Tel. & Tel. Company. Additional toll terminal facilities have been installed at Hot Springs and at Hatch in connection with the circuit.

The Northwestern Bell Telephone Company, Spencer, Iowa, has recently moved into its new home. It now has one of the finest exchanges of its size in the state of Iowa. The cost of erecting and equipping the building was more than $150,000, and incorporates the latest type of telephone apparatus.

The Bell Telephone System New York City, reported a distinct improvement in August in the number of telephones disconnected. The loss to the system was 201,000 in August, compared with a loss of 268,000 in July. Telephones disconnected in August were 44,000 fewer than in July, while connections were 23,000 more than in July. These two months are normally the least favorable for telephone installations.

Approval of an appropriation of $97.20 for leased wire signal service at the newly completed reservoir near Memorial Park, Kalamazoo, Michigan, was given by the Commission. This appropriation will provide for the cost of signal service by the Bell Telephone Company for the remainder of 1932.

A new line of radio telephone equipment for aircraft has been developed as the result of the experience gained from many million miles of flying during the past three years. The various air lines have co-operated by making many practical recommendations. The new system enables the pilot to change from one frequency to another by simply pulling a lever in the cockpit. The new transmitter is arranged to transmit on any of three pre-arranged frequencies and new types of tubes do away with the necessity of neutralizing the transmitter.

Fewer telephone removals and increased installations took place in Providence, R. I., during August. Indications show that the trend will be further improved for the future.

CONVENTION SCHEDULE

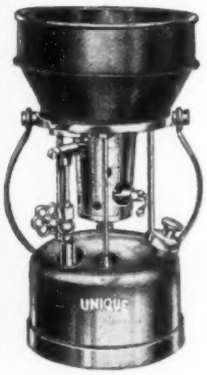
United States Independent Telo. Ass'n., Eastern Group, Hotel Deshler-Wallick, Columbus, Ohio, October 18, 19 and, 20.

Independent Pioneer Telo. Ass'n., of the United States, Hotel Deshler-Wallick, Columbus, Ohio, October 19.

United States Independent Telo. Ass'n., Western Group, Hotel Fort Des Moines, Des Moines, Iowa, October 25, 26 and 27.

Missouri Telephone Association, Hotel President, Kansas City, November 10 and 11.

Illinois Telephone Association, Hotel Pere Marquette, Peoria, November 16 and 17.



TEN MINUTES

to melt 50 pounds of solder! Couple this feature to the strength and simple design of all UNIQUES — and you have the reason it's preferred in the telephone field. We'll send it on trial. Write—

UNIQUE
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Chicago, Illinois

New Telephone Practice Increases Revenue

Telephone Answering Service, a Supplementary Assistance, Continues to Expand Rapidly, Provides Employment for Hundreds of Employees, and Increases the Revenue for Telephone Companies.

Telephone Answering, America's newest industry, has doubled its business during the past two years despite the decline of business generally, and gives promise of becoming a highly important offshoot of the science of telephony before 1935, according to an analysis of this little-known industry prepared by Sherman Amsden, president of Telephone Answering Service, 40 East 61 Street, New York City, oldest and largest company in the new business.

Starting in 1922 with three subscribers, one telephone operator and a plan for automatically picking up telephone calls that would otherwise go unanswered, the telephone answering business now boasts of companies in 20 cities, serving ten thousand telephone users, provides employment for 500 telephone secretaries and represents an investment of more than $1,000,000 in telephone wires, switchboard equipment and maintenance of private exchanges.

300,000 Telephone Calls Unanswered Daily in Manhattan

Approximately 4,800,000 telephone calls are made on every business day, in Manhattan alone. Of these, six per cent or nearly 300,000 go unanswered. The telephone answering services throughout the country intercepted only ten million calls last year, or about 30,000 per business day. In other words, the entire telephone answering business of the country, if concentrated in Manhattan, could not take care of more than ten per cent of that city's unanswered calls.

Today, Telephone Answering is done by experienced operators trained in the special technique of the telephone secretary who talks from a private exchange connected through the telephone company's central office, with the subscriber's wire. Signalled by her special switchboard when the subscriber — blocks or miles away—does not answer his phone, the telephone secretary answers in his name and not only takes the message but conducts the subscriber's business as if sitting at his office phone. The telephone secretary accepts or places orders, cancels or makes appointments and, when the call is urgent, traces the absent telephone subscriber, frequently by long distance or telegraph, by cable or personal messenger if necessary, to deliver important messages.

$500,000 Yearly Saved to Telephone Companies

During the current year, Mr. Amsden's analysis points out, the Telephone Answering industry provided work, directly or indirectly, for some hundreds of telephone company employees, besides converting several millon nickels resulting from what would otherwise remain unanswered calls into telephone company profits. In addition to saving the telephone companies of the country upwards of $500,000 a year in rescued calls, telephone answering services put $400,000 every year into the telephone companies' treasuries for special wire mileage. And the business deals consummated as a result of calls saved by the telephone answering services, while impossible to compute, run into millions of dollars annually.

Telephone Answering services are now operating in Albany, Boston, Buffalo, Chicago, Cleveland, Los Angeles, Montreal, Philadelphia and other principal cities of the country, although the business is still in swaddling clothes. Plans are afoot for the establishment of such services in a number of other cities. The possibilities for a nationwide merger of all telephone answering services has been under consideration by the several leading companies in the field, and the prospect of consolidation seems likely as soon as general business has regained its normal pace. A merger is favored by the more important services because it would put aggressive management in control and more rapidly expand the field.

Actors, artists, authors, architects, attorneys and other professional people were the original users of telephone answering services because they could blithely lock their doors behind them, satisfied that people calling them would be given the messages meant for them, and that inquiries, commissions or clients coming by phone would receive courteous attention. Formerly such people had been virtual shut-ins for fear their office or home phones might ring while they were out. Beginning 1930, considerable numbers of mercantile organizations, that had been forced to cut their staffs, welcomed the helpful economy of a service outside their own offices which gave them the 24-hour service of a squad of telephone secretaries, each with the smile in her voice that they had trained their own secretaries to have, and each apparently with an intimate knowledge of their work.

Repair companies servicing elevators, radios and refrigerators also are turning to Telephone Answering to attend to phone calls that come when the men are out on jobs, or after hours. Other companies that now employ Telephone Answering include: chemists, insurance men, engineers, photographers, musicians, travel bureaus, accountants, airways, designers, advertising agents, interior decorators, manufacturers' representatives, real estate men, and even detectives and bondsmen.

TOMLINSON RETIRES AS PHONE HEAD

Sam Tomlinson, prominent Plymouth, Indiana, citizen who has been actively associated with the development of the telephone business for the last quarter of a century, has retired. The position as manager of the Plymouth district has been taken by Walter E. Carlson of Rollo, Missouri.

Mr. Tomlinson became connected with the Winona Telephone Company in 1903. At that time the local telephone exchange boasted 400 subscribers. During the quarter of a century which Mr. Tomlinson had charge of the company, he had the pleasure of seeing a gain in the plan from 400 to 1900 subscribers which it has today.

MEETINGS OF THE U. S. INDEPENDENT TEL. ASSOCIATION

The programs of the United States Independent Telephone Association meetings being held at Columbus, Ohio, October 18-20, and Des Moines, Iowa, October 25-27, include matters of such importance to the industry at this time, that a large attendance is anticipated at both cities, and from the reports received it is evident the meetings will be well attended. Managers are especially invited by the Asosciation to bring their staff with them.

Stromberg-Carlson Equips Wisconsin Town

Here Is an Interesting Story of a Company That Began Its Career In the Late 90's with Only 20 Subscribers, and Has Steadily Expanded Until It Was Necessary to Install a 1600 Line Capacity Board

By C. F. SANDERS
Sales Engineer
Stromberg-Carlson Telo. Mfg. Co.

Starting as a company with two operators and twenty subscribers in the late 90's and steadily expanding to one which is today operating a new, up-to-date four position Common Battery Switchboard with an ultimate capacity of 1600 local lines, is in short the history of the life of the Commonwealth Telephone Company of Chilton, Wisconsin.

But this alone does not describe the eventful life of this company. To give a true picture one must begin at its origin.

The Chilton Telephone Exchange was started some time in the late 90's as a Mutual Exchange with approximately twenty telephones.

In 1901 the Eastern Wisconsin Telephone Company was organized, and was owned and operated by G. A. Kraemer, W. F. Pinnow and others. They bought out the mutual company and started to build a new exchange —removed all the old equipment and purchased a new 100-line switchboard. In 1906 there were 95 lines in use and it was foreseen that the board would soon be crowded to capacity. The 100-line switchboard was replaced by a 250 line magneto switchboard. Two more 100-line switchboards were added in the years following until by 1931 there were 510 lines in service.

The Eastern Wisconsin Telephone Company started out with two operators and long distance toll service was only to be had by going to the drug store where a toll station was placed.

In 1922 a severe sleet storm wiped out most of the plant and a new cable system was installed included considerable underground conduit and cable.

The switchboard was moved to the company's headquarters in 1923 where the magneto equipment has served until February 3, 1932 when the new common battery equipment was cut over.

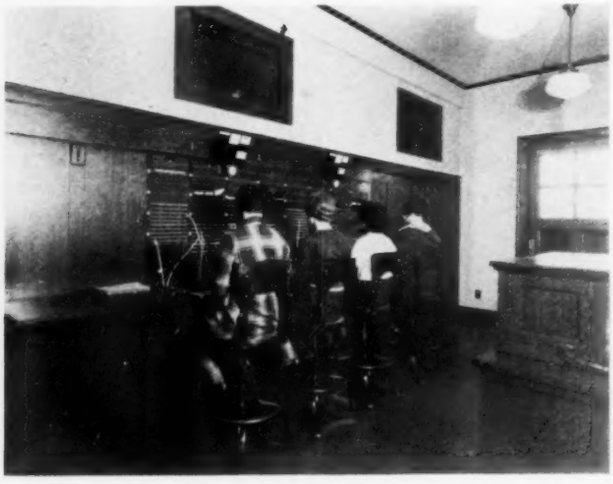
In 1925 the Eastern Wisconsin Telephone Company was purchased by the Consolidated States Telephone Company and operated under the name of the State Telephone Company of Wisconsin, the name being later changed to Consolidated Telephone Company of Wisconsin. In December, 1927, this latter company was acquired by Associated Telephone Utilities System and later the System's Wisconsin Operating Company, Commonwealth, acquired Consolidated Telephone Company of Wisconsin.

In 1931, the Commonwealth Telephone Company realized that the magneto equipment serving Chilton had reached its ultimate capacity and decided to build a new office and exchange. The new building was erected in the Fall of 1931.

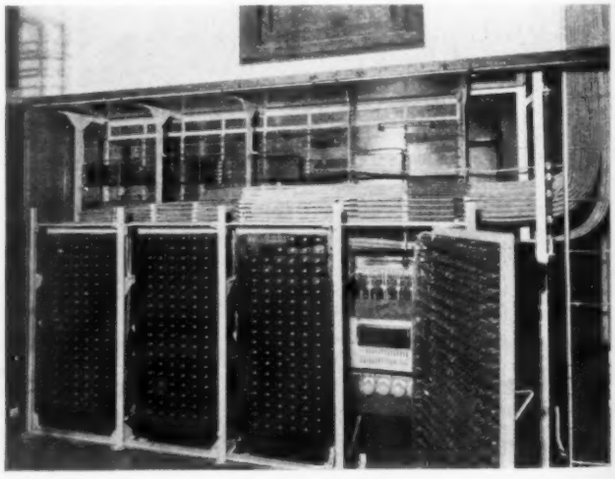
It is a one-story red brick building, handsomely decorated, with a main entrance for the operators and other employees. In the front entrance is a small vestibule equipped with a pay station which is accessible to the public at all times. The vestibule leads into a lobby furnished with a comfortable settee and two pay station booths. To the left of the lobby is the cashier's office, and both office and lobby connect with a hallway from the side entrance of the building. A few steps down the hall on the left is the manager's office and directly across from it is the operator's rest room. The operating room occupies the southwest corner of the building and is light and cheery. The terminal room is in the southeast corner of the building and is the last word in convenience and accessibility.

The basement affords ample storage for the storage of equipment, tools and parts.

The new switchboard installed is a four position common battery Stromberg-Carlson unit type. It has an ultimate capacity of 1,600 local lines, and is equipped with 500 local lines, 60 rural lines and 20 toll lines, all of which are multiplied throughout the board. Each position is equipped with seventeen universal cord circuits, so that any call can be answered and completed at any one position without the use of



New Stromberg-Carlson switchboard in operation at Chilton, Wis.



Rear view of the new Stromberg-Carlson switchboard at Chilton, Wis.

NEW ECONOMY AT BOTH ENDS

•

lower prices in the beginning
longer life in the end

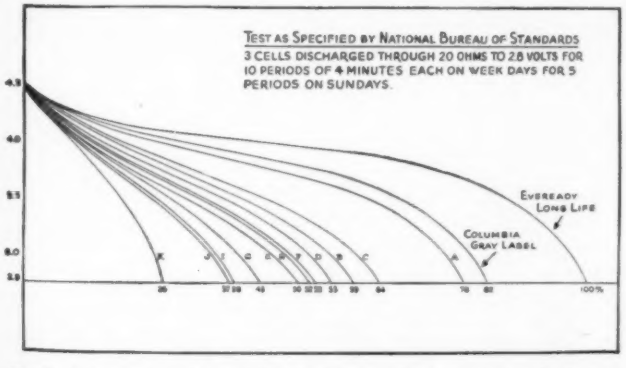
PRICES on Eveready Long Life Telephone Batteries are now 'way down. And after far outlasting ordinary batteries, you'll find these super-service dry cells have effected further savings in your telephone operating costs. . . . For the world's largest dry-battery laboratories and factories have developed in them outstanding features for long, uniform and dependable service.

"Cheapest in the end" is truer of Eveready Long Life than ever before — especially when you consider the added saving in labor due to less frequent replacements; the clearer transmission qualities; the better customer satisfaction; the fewer service interruptions.

Study the chart. See where Eveready Long Life stands — with Columbia Gray Label not far behind. . . . And both ahead of the field. Then consider the

All-armored Construction

— new metal-seal top (patented by us) and thick, even-grained sheet-zinc can. No wax to chip or crack; no oozing substances to damage equipment. Insulated against energy loss; sealed to prevent moisture and electrolyte leakage; finest materials, from controlled sources and properly proportioned to give full capacity . . . these are other points of Eveready Long Life superiority.


TEST AS SPECIFIED BY NATIONAL BUREAU OF STANDARDS
3 CELLS DISCHARGED THROUGH 20 OHMS TO 2.8 VOLTS FOR 10 PERIODS OF 4 MINUTES EACH ON WEEK DAYS FOR 5 PERIODS ON SUNDAYS.
EVEREADY LONG LIFE
COLUMBIA GRAY LABEL
100%

Day's life on Standard Intermittent test is expressed in percentages based on Eveready Long Life as 100%. The Columbia Gray Label shows 82% service, but also carries a lower price.

Ask your distributor for the new low prices. Order a supply. Date your replacements, check your ultimate costs — and note the economy.

EVEREADY
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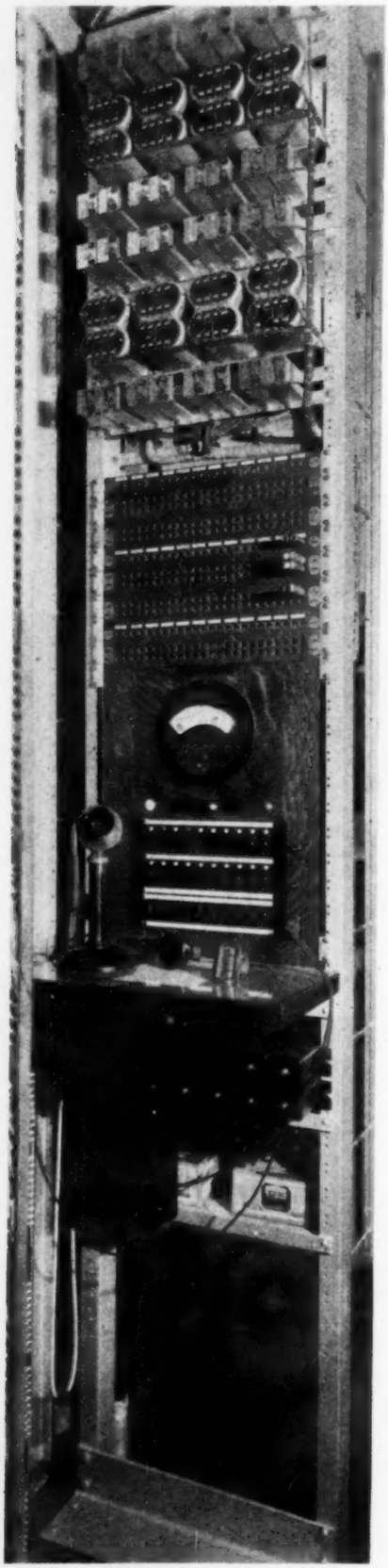
NATIONAL CARBON COMPANY, INC.
General Offices: New York, N. Y.
Branches: Chicago New York San Francisco
Unit of Union Carbide and Carbon Corporation

order wires and trunking circuits.

The chief operators desk is equipped with two information and complaint trunks, one switchboard line, and monitory and talking circuits and electrically operated message registers of each position.



Wire chief's equipment in exchange at Chilton, Wis.

The wire chief's test turret is placed in the toll bay, which is in line with the line relay rack with the toll test lines as well as local lines. The repeating coils and condensers are at the extreme top of the toll bay.

The main distributing frame, an A-type, is equipped with Cook No. 100 protectors and terminates 1,200 cable pairs from the local distribution plant and a 25 pair toll cable.

The power equipment, the most modern to be had, consists of a slate power panel with dual harmonic converters, dual rotary interrupters automatically controlled, and a 120 ampere hour battery with automatic charge control. The battery is in the basement in a well lighted and ventilated room.

The new central office was installed by Commonwealth Company Installers, under the supervision of W. J. Connors of the Stromberg-Carlson Company.

All the work was finished and everything was ready for the cut-over within a very short time.

The Chilton Kiwanis Club, in appreciation of the improvement in telephone service, entertained the telephone officials at a dinner the night preceding the cut-over, during which several talks were made on the telephone equipment.

That the new service is appreciated by the public was evidenced by the compliments on the speedier handling of calls that had been experienced since the inauguration of the new switchboard.

STORMS COSTLY TO BELL TELEPHONE CO.

Construction and maintenance forces of the Bell Telephone Co., in Hazelton, Pa., are still working hard repairing the widespread damage caused in this part of the state by devastating windborne snowstorms which swept the north central part of Pennsylvania March 6 and 7.

Before the reconstruction program is completed, probably in December, the telephone company will spend some $375,000 for the purpose. That's what two severe storms have meant to the telephone industry in the north central section of Pennsylvania alone. Considerable damage was brought in other parts of the state by the same storms.

An idea of the enormity of the reconstruction project may be gleaned from the fact that the Bell company is removing 1,910 poles, 3,744 crossarms, 5,610 feet of serial cable and a vast amount of telephone wire damaged by March storms.

That the company is sparing no pains to restore its damaged facilities to the highest standard of efficiency is shown by this summary of the new equipment being placed in service throughout this section of the state.

More than 1,900 new poles, 161,137 feet of storm-resisting serial cable, 1,448 feet of underground cable, 1,395 miles of new telephone wire and a substantial amount of other equipment needed in the construction of telephone lines.

UNDERGROUND TELEPHONE LINES TO BE INSTALLED

The laying of underground cables in the business district of Guthrie, Oklahoma has been started by the Southwestern Bell Telephone Company.

These cables will take the place of the cables now being carried on the telephone poles along the streets and alleys. The improvement will not only furnish labor to a number of men and be more satisfactory, but the removal of the cables from the poles will be an improvement in the appearance of the city.

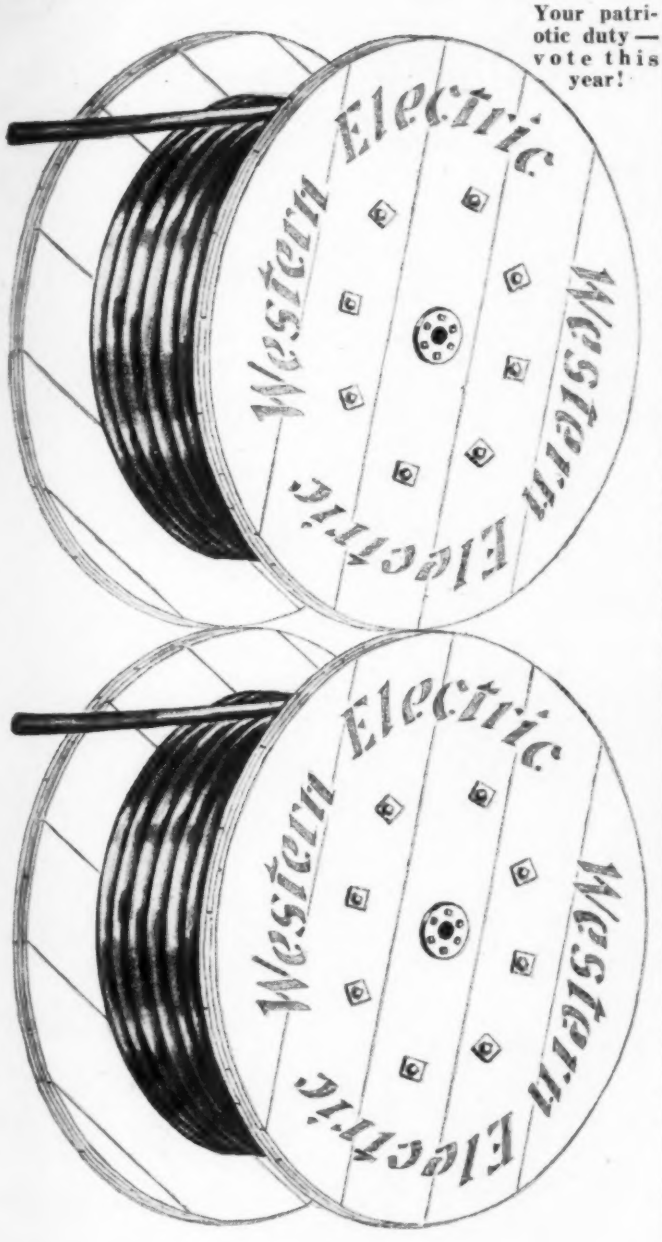
TELEPHONE MAN RECEIVES PROMOTION

W. H. Clark, a well known telephone man, who has been with the old Kinlock system in St. Louis before it was absorbed by the Bell Telephone Company, and who has a record of service for the last 30 years, has been promoted to the postmastership of the Bell telephone building in St. Louis, Mo. This is a promotion, and gives him a place in their organization that carries much responsibility and honor. His predecessor, who had 35 years of service with this company, resigned on account of ill health and Mr. Clark was in line because of his seniority. It is a choice position, yet is handed those whose services have been of such nature and duration as to merit appointment.

COMMISSION ACTS

Permission to purchase certain telephone property located in Bureau, Henry, Rock Island, Marshall, Peoria, Tazewell, Mason, Menard and Sangamon counties, in Illinois, from the American Telephone & Telegraph company has been granted to the Illinois Bell Telephone company by the Illinois Commerce commission.

Your patriotic duty—vote this year!



CABLE...

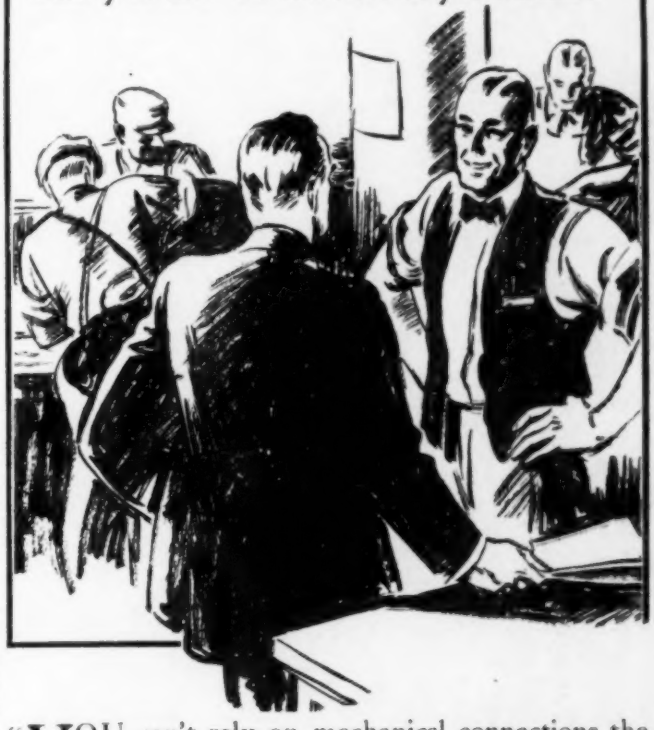
and 60,000 other items

The guarantee of quality implied by the name Western Electric on Western Electric lead-covered cable has long been recognized by the telephone industry. But equally important is the additional endorsement of Graybar—an endorsement that insures the quality of 60,000 electrical items.

GraybaR

OFFICES IN 76 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., N. Y.

"Be Sure" of every connection in your Whole System!"



"YOU can't rely on mechanical connections the way you can on Kester Solder. With Kester, joints and connections are made permanently secure. There's Kester Acid-Core solder for splices, grounds and drops—then there's Kester Plastic Rosin-Core for more delicate work, such as switchboard wiring."

Kester is fast and easy—safe and certain. Buy Kester from your telephone supply house. And write for our free book, "Successful Telephone Soldering".

KESTER SOLDER COMPANY
4210 Wrightwood Avenue, Chicago, Illinois
Eastern Plant, Newark, New Jersey
Canada, Kester Solder Company of Canada, Ltd., Brantford

The Accepted Standard of the Telephone Industry

HELP UNEMPLOYMENT
by purchasing U. S. products made by U. S. labor
KESTER SOLDER IS 100% AMERICAN

KESTER
FLUX-CORE
SOLDER
Acid-Core • Paste-Core • Rosin-Core

easy to use

Fallon, Nevada, Installs Kellogg Equipment

A County Owned System That Has Been Earning a Good Profit Continuously Insures Its Future Profits and Service Through the Purchase of a New Kellogg Switchboard

By H. A. ARTH
District Manager
Kellogg Switchboard & Supply Co.

Fallon, Nevada, and Churchill County of Nevada recently completed another portion of their program to make the city of Fallon and Churchill County the most progressive section in Nevada by installing a new Kellogg 6-800 Masterbuilt switchboard in the Churchill County Telephone exchange.

Fallon, a county seat town, located in the center of the newland irrigation project, has a population of more than 2,000 people. It is located on the Lincoln Highway and is an important supply depot for the surrounding county, which includes a number of mining districts.

The city of Fallon owns the water system, lighting system and sewerage system. So successful has municipal ownership been, that the city has been able to improve its street and public lighting systems with the profits realized through the operation of these utilities. The extremely successful Churchill County Telephone and Telegraph System is owned by the county. The system was begun in 1895 when the county purchased an abandoned telephone line and installed five telephones. As the population increased and more people realized the value of telephones in their homes, offices and stores, the company grew larger. In 1903, the first switchboard was installed to serve the ever-increasing number of subscribers.

As subscribers increased and the company expanded, Tom Sanford, superintendent of the telephone system, made many improvements throughout both the interior and exterior plants. The county commission realized that modern telephone service was a real necessity, and essential to the future progressiveness of Fallon and the entire county. As a result they decided to obtain new central office equipment for the company.

After considerable investigation, the commission decided that a two position 6-800 Masterbuilt switchboard would best satisfy their requirements. Among other considerations that were important factors in determining the choice of a Masterbuilt switchboard, was the great flexibility of this equipment—a feature that assures new opportunities and new possibilities to any exchange. There is no expensive rearrangement cost encountered by Masterbuilt exchanges when growth requires additional switchboard capacity. A Masterbuilt switchboard provides a safe and permanent investment. Here is what Mr. Sanford says about his company's new switchboard:

"Our new 6-800 Masterbuilt Switchboard arrived and we desire very much to express how pleased we are with same.

"All statements that you have made about the 6-800 Masterbuilt Switchboard about appearance, flexibility, low installation cost, are more truth than poetry.

"We are proud to advise that the 6-800 Masterbuilt Switchboard was cut in service yesterday without any trouble whatever.

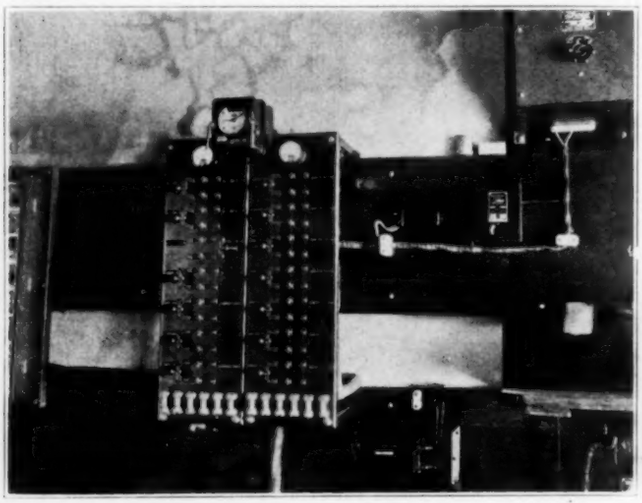
"We have already noticed the speedy operation and wonderful transmission involved in the Masterbuilt board.

"These facts were the main reasons for placing our order with you and we just had to express how satisfied we were with our new equipment."

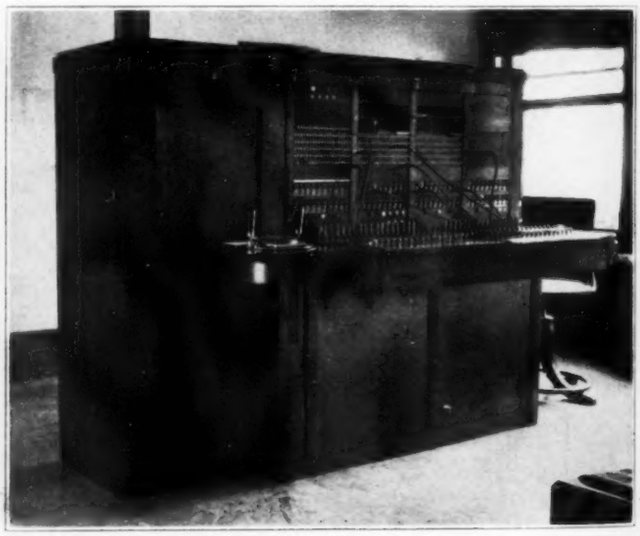
This board is equipped with 320 Universal line circuits, 70 rural lines and 10 toll circuits with Universal cord circuits, as well as automatic harmonic ringing, calculagraphs, and automatic charging equipment, together with a Kellogg Senior type Wire Chief's board.

This County-owned telephone system has one of the finest exchanges on the West Coast, and has been making money for quite some time. So far this year, it has made expenditures of over $20,000 out of profits that were earned through the good, business-like meth-

(*Please turn to page* 34)



Converter, power board and other power equipment that was recently purchased and installed by the company out of their earnings.



The new 6-800 *Kellogg Masterbuilt switchboard recently installed by the company.*

TELEPHONE EXECUTIVES

Here **IS** *a buy*

$2 PER DAY

Buys a comfortable Room with bath at the

PICKWICK ARMS HOTEL

on the East Side convenient to Grand Central Club facilities, with completely equipped Gymnasium

RATES		
	WEEKLY	$10-$1
	LUNCHEON	55c
	DINNER	75c

Pickwick Arms

A MODERN 400 ROOM HOTEL

230 E. 51st • NEW YORK

Tel. ELdorado 5-0300

YOU WILL BE AMAZED TO LEARN HOW MUCH YOU CAN SAVE EACH YEAR IN THE COST OF YOUR WORKMEN'S COMPENSATION AND LIABILITY INSURANCE

A postcard will bring you the facts and figures.

UTILITIES INSURANCE COMPANY

A STOCK COMPANY OPERATED BY LYNTON T. BLOCK & CO.

511 Locust St. St. Louis, Mo.

Specialized Insurance for Telephone Companies

New Baby Giant Gas Projector

Protect Your Men While Making Collections and Transporting Cash to Bank

Powerful---Safe---Handy---Inconspicuous

THIS IS JUST THE THING FOR YOUR ROUTE MEN

CAN BE USED AS A "BILLY" AFTER DISCHARGE

Specifications

Gauge 20 (17 mm.) Weight 6 ounces, length 6¾ inches, range 10 to 12 feet, spread of gas, four-foot circle at 10-foot range. SAFETY—Easily operated safety device that positively guards against accidental discharge. Handy to carry in pocket or automobile. Convenient for desk drawer or cashier's cage. Projects a very powerful TEAR GAS which blinds and chokes the victim into complete submission and renders his capture easy and safe.

DOES NO PERMANENT INJURY—Approved By Underwriters Laboratory

THE MOST POWERFUL POCKET SIZE GAS WEAPON IN EXISTENCE

Price and further description upon request.

Chemical Warfare Products Co.

Suite 1218, 63 West Lake Street Chicago, Ill.

The Telephone Receiver as a Test Set

After Becoming Familiar with This Simple Set, the Troubleman Will Soon Find It to be as Indispensable as a Doctor His Stethoscope

By RALPH J. SERY
Associate A. I. E. E.

Probably the most rugged, compact, sensitive and universal test set available in one instrument is to be found in an ordinary operators' head receiver and may oftentimes be one discarded as not sufficiently sensitive for regular use.

Before going into the tests that may be made with a telephone receiver it might be well to describe a type of receiver test set I have found to be the most convenient after many changes. Any operators' receiver will do although preferably one of the lightweight models with a head band that may be readily slipped on and off the head. It is well, if the receiver is to be placed across battery or current sufficient to heat the receiver and is one with the coils impregnated with wax, to put the receiver across battery just sufficient to melt any surplus wax from the receiver. Otherwise, just at the wrong time the surplus wax will run between the pole pieces and diaphragm, there to harden and interfere with its operation. The resistance of the receiver should be the standard receiver resistance of eighty or one-hundred ohms.

For cords, the most satisfactory are waterproof cords but these are not usually to be found around the average telephone exchange. They are more durable and are less apt to become twisted and tangled. However, any new cords will do, old cords are not to be thought of since the rough usage these cords will be subjected to make their life short at best. The most satisfactory length is found by hanging the receiver around the neck with cords attached, and cutting them off so they just clear the floor. This allows the user to move freely about without becoming tangled in the cords.

On the ends of these cords may be placed clips or picks of various kinds. I have found that two small clips are the most convenient although some use one clip and one pick, this again being a matter of personal choice. A pick attached to a short cord may be used whenever it becomes necessary to use a pick by clipping the clip to the cord attached to the pick.

There are a variety of picks that may be bought although half of a knitting needle insulated for most of its length serves very well unless one to prick through insulation is wanted. For this purpose one holding phonograph needles is the most satisfactory.

I will attempt to describe only a few of the multitude of tests that may be made with this simple test set. If the suggestion of the separate test pick attached to a short cord is followed, it will be very convenient to use with a battery in series so we come to the most simple one, that of testing for conductivity. By connecting the test receiver in series with battery a circuit may be traced through a coil, cord circuit, or any closed circuit by the clicks heard in the receiver. Similarly, condensers may be tested. If short, one click after another will be heard at each connection to the condenser. If good the condenser will become charged at the first click and will not give another click in the receiver until the condenser has been discharged.

Loose connections on a common battery system may be easily found by following along the line with a receiver until the loose connection has been passed. Cut-outs on magneto systems may be found by putting battery on one end and following along in a manner similar to the common battery method.

It often becomes convenient to test for battery or generator on P.B.X. circuits and very often rough tests for shorts or grounds may be made by using the available battery or generator.

Two test receivers may be used for an emergency talking circuit to very great advantage. To be sure the transmission efficiency is sadly lacking, but does very well when more efficient sets are not available.

In testing telephone circuit troubles and particularly magneto troubles the receiver is of inestimable value. By placing the receiver in various positions in the circuit, parts may be tested and the circuit followed, aiding greatly in finding the trouble.

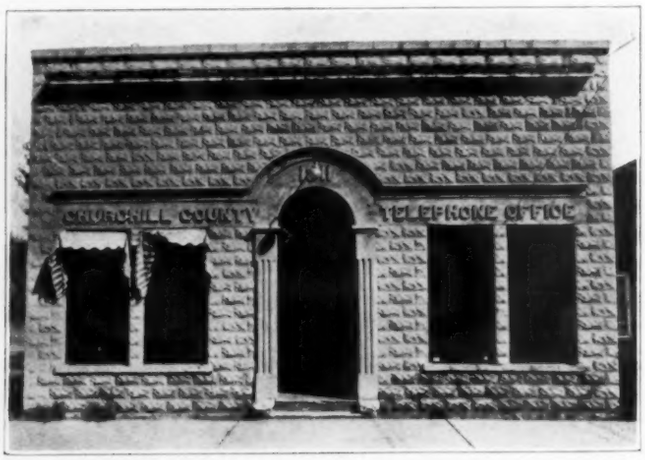
I have made no attempt to give more than a few of the many possibilities of this simple, yet sensitive, little set. Any troubleman, be he looking for cable, line, instrument or central office trouble, who will become familiar with simple test set will soon be as lost without his test receiver as a physician would be without his stethoscope.

(*Continued from page 32*)

ods the County Commissioners and Mr. Sanford have used. The company has over 900 subscribers and serves the whole of Churchill County which has a population of 5200.

It is surprising to note that there have been no added taxes for the maintenance or improvements of this telephone system. In fact, there was only one assessment, and that was years ago when the system was first started.

The new 6-800 Masterbuilt switchboard installation was completed September 11, 1932, and the cutover was made without trouble or interference.



The attractive well-built home of the Churchhill County Telephone Company, owned and operated entirely by the county.

ASSOCIATED TELEPHONE UTILITIES CO HAS NEW YORK OFFICES

The executive offices of the Associated Telephone Utilities Company, have been moved to 80 Broad Street, New York, having been opened there on October 3.

Offices of the company since its organization have been in Chicago. The operating headquarters for the eastern area are maintained in Madison, Wis.

NEW SWITCHBOARD FOR RALSTON TELEPHONE CO.

A two-hundred line switchboard has been put into service recently at the Trout Run office of the Ralston Telephone & Telegraph Company, Williamsport, Pa. The cut-over was effected with a minimum interruption of service and was carried out with clock work precision, requiring just 30 seconds to make the change. The new board replaced a 50-line switchboard that has been in use for about 27 years and which had become obsolete and a source of considerable trouble.

The Company is establishing and equipping a business office adjacent to the exchange room.

This new replacement is one of the many changes to be made and is in line with the general rehabilitation program for increased facilities for giving efficient telephone service to the upper valley subscribers.

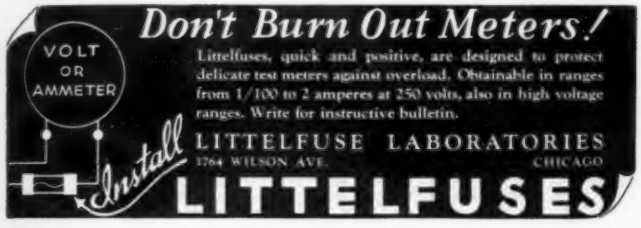
All wires entering the exchange will be through underground cables and will displace the unsightly overhead wires spanning the Pennsylvania railroad and the state highway. All circuits in Trout Run have been renewed and many new telephones installed during the past several weeks resulting in establishing a new record for week-end calls through the Trout Run exchange.

A shipment of northern white cedar telephone poles, tons of copper wire and other equipment has been received and work will be started within a short time rebuilding the lines and reclamating of circuits which were thrown out of service during the storm breaks of last spring. Much of the old equipment has already been cut out and new replacement material will be used wherever required and new poles set to replace those which have been broken off or become unsafe.

In view of the present unemployment situation, local labor will be used as far as practicable, giving preference to those residing in the territory served by the company.

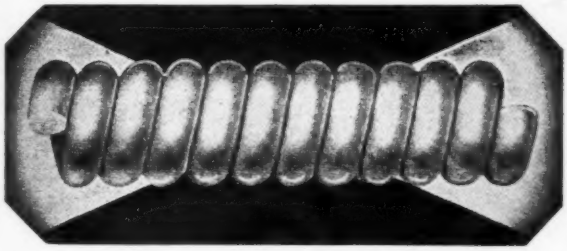
I. T. & T.-ERICSSON DEAL REPORTED READY TO SIGN

New York.—Completion of International Telephone and Telegraph Company's contract for an interest in the Ericsson Telephone Company of Sweden is expected shortly, according to advices from abroad. International's claim to the controlling stock of Ericsson has been in abeyance temporarily owing to complications arising out of the difficulties of the Kreuger & Toll Company, which formerly controlled Ericsson. The latter is an important manufacturing and operating unit in the foreign telephone field.



Don't Burn Out Meters!
Littelfuses, quick and positive, are designed to protect delicate test meters against overload. Obtainable in ranges from 1/100 to 2 amperes at 250 volts, also in high voltage ranges. Write for instructive bulletin.
LITTELFUSE LABORATORIES
1764 WILSON AVE. CHICAGO
LITTELFUSES

W. L. Runzel, President, brings to this organization 41 years' experience in the manufacture of this type of telephone equipment
Telephone and Switchboard Cords and Wire
May we quote you on your requirements?
RUNZEL CORD AND WIRE CO.
4727-31 Montrose Ave., Chicago
The Home of the Perfect Cord


Galvanized Telephone Wire and Steel Strand

Crapo Galvanized Wire can be wrapped around its own diameter without injury to its pure zinc coating....That is one of a number of reasons why **Crapo** Galvanized Telephone Wire and Strand can be depended upon to reduce maintenance cost.

Look for the **Crapo** Seal!

Indiana Steel & Wire Co.
Muncie, Indiana

Crapo GALVANIZED PRODUCTS

Toll operators are human!

It would be manifestly unfair to place blame on the toll operator who makes mistakes when no better time-keeping tools are provided than a visible indicator of the time of day, and a pencil. The telephone executive who argues that his operators today are personally "more efficient," "more expert," or "more experienced" than those of earlier generations, is only deceiving himself. Even the briefest experience with the Calculagraph proves this to him.

With utmost precision, the Calculagraph mechanically computes and prints ELAPSED TIME. A pull of the handle clearly and indelibly stamps *on the toll ticket* the time of day of each call, also the actual ELAPSED TIME the circuit is in use, for any number of calls. No arithmetic by pencil—no diversion from other duties—no chance of error—the Calculagraph is easily and quickly operated while conversing with either the calling or answering party. The Calculagraph is now supplied in either the well-known spring-driven model or an electric-driven model operated by electric impulses from a master clock (24 or 48 volts), or by self-starting synchronous motor (60 cycle A. C.). Prices and detailed information on request.

THE CALCULAGRAPH COMPANY
50 Church St. Dept. 22 New York City

CALCULAGRAPH
THE ELAPSED TIME RECORDER

With Manufacturers and Jobbers

LITTELFUSE DESIGNS NEW FUSIBLE JACK

A new Fusible Jack has been designed, enabling the user to employ the correct size of fuse for each scale reading on multi-range meters and still be able to shift readily from one range to another. The Fusible Jack is secured under the binding post of the instrument, and the fuse is enclosed within the bakelite barrel which is merely unscrewed to make fuse renewals. A solderless pin plug permits installation without the use of tools.

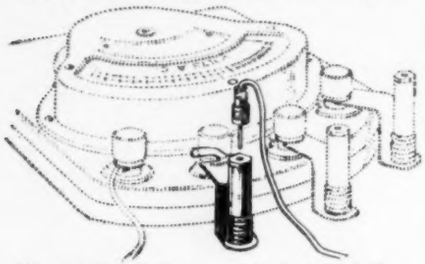


Illustration of the recently designed Fusible Jack by the Littelfuse Laboratories.

The fuses used in this mounting are Instrument Littelfuses and come in 1/100, 1/32, 1/16, ⅛, ¼, ⅜, ½, ¾, 1, and 2 amperes capacity. On account of their quick acting characteristics they afford protection to even the most delicate instruments.

These fuses and mountings are manufactured by the Littelfuse Laboratories, 1772 Wilson Avenue, Chicago, Illinois.

FWD AUTO COMPANY PAYS REGULAR SEMI-ANNUAL DIVIDEND

Directors of The Four Wheel Drive Auto Company, Clintonville, Wisconsin, authorized the payment of the semi-annual 3% cash dividend on October 1, 1932. This dividend on the outstanding common stock is paid regularly on April 1 and October 1 of each year. Checks were issued to all stockholders of record as on September 26. The company has no issue of preferred stock and reports no bonded indebtedness whatsoever.

Producers of heavy-duty four-wheel-drive trucks for the past twenty-two years, this firm is unique among industrial organizations in several respects. It is managed today by practically the same group of officers as when the corporation was organized in 1910. W. A. Olen, President and General Manager, Frank Gause, Secretary, and D. J. Rohrer, Treasurer, still hold the same positions as they did twenty-two years ago. Four members of the original board of seven directors are still acting in the same capacity. There have been only seven changes in the board of directors in twenty-two years, four of these being due to retirement of members and three to deaths. Another unusual fact is that the plant, covering 225,000 square feet of floor space, is located in a rich agricultural region rather than in a typical industrial center.

USE OF JOSLYN SAMSON STUBBING CLAMPS INCREASING

Where strength, rigidity, or dependability are required of old pole lines—stubbing has become the standard practice.

The new Joslyn Sampson Stubbing Clamp method of stubbing is an efficient system which is gaining high favor by its economy and adaptability.

The first consideration in stubbing should be strength. Tests have proven poles stubbed with the exclusive Joslyn Samson "Cross Angle Support" method are as rigid as new poles. There are no holes to bore to weaken the pole—it is a clamping method—and the only stubbing device with Cross Angle Support. The band used keeps the pole and the stub from pulling apart, and the saddle keeps the pole and the stub from rolling or weaving.

Joslyn stubbing clamps make a stubbed pole line as strong as a new one.

With this method the Cross Angle Support gives stubbing rigidity at all angles, and the stub and pole can be set parallel with the line, thus overcoming the objectionable appearance of stubbed poles in suburban districts. The termite infested pole can be sawed off above the ground. The cross angle support makes the pole and stub as one unit.

This method of stubbing doubles the life of poles. As compared with the installation of new poles, it costs about one-half. While this Stubbing Clamp with the "Cross Angle Support" develops greater strength, it is the easiest and quickest of all methods or devices to install.

It has been proven that Joslyn Stubbing Clamps make a stubbed pole line as strong as a new line. In a test using 40-foot pole, 11 inches in diameter at the butt, with the clamps 5 feet apart, a pull of 2000 pounds was applied at the end of the pole without injury to pole, clamps, or stub. These clamps pay for their use by a saving of 75% in labor in installing and because, being Hot Dip Galvanized, they may be salvaged and used over again.

The complete unit consists of a clamping band and a saddle. The saddle is placed between the pole and the stub, prevents rolling and by providing an air space between the pole and the stub, keeps them from rotting. The band encircles the pole and stub. A series of holes permit adjusting. A 5/8" thru-bolt of proper length is used through band and saddle, taking up slack and making the combination rigid and secure.

The Joslyn Mfg. & Supply Co., 3700 South Morgan Street, Chicago, Ill., will be pleased to give further information about these clamps.

POLICE HEADQUARTERS HAS NEW PHONE BOARD

A new telephone switchboard has been installed in the office of police sergeant at Springfield, Missouri. The new board will mean greater convenience and efficiency, as the plan will eliminate all dead lines and provide for all calls being handled by a single operator. There are six telephones in the building and the new arrangement may add considerably to the duty of the sergeant's office. In the event the work becomes too heavy, the sergeant will be relieved by one of the police women.

WESTERN ELECTRIC GETS BIG ORDERS

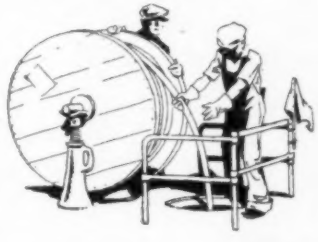
Orders for nearly $50,000 worth of the new type of aviation radio-telephone apparatus which was announced by the Western Electric Company only late last month, have already been received, it was learned from the Company today. The bulk of the orders has been placed by American Airways and United Air Lines.

COOK CABLE TERMINALS

for AERIAL—UNDERGROUND and GAS FILLED CABLE
PROTECTED, UNPROTECTED OR CROSS CONNECTING

30 years of experience in designing and building equipment for terminating, distributing and protecting lead covered telephone cable is at your disposal.

COOK ELECTRIC COMPANY
2700 Southport Ave., Chicago



HOTEL LORRAINE

WABASH AT VAN BUREN

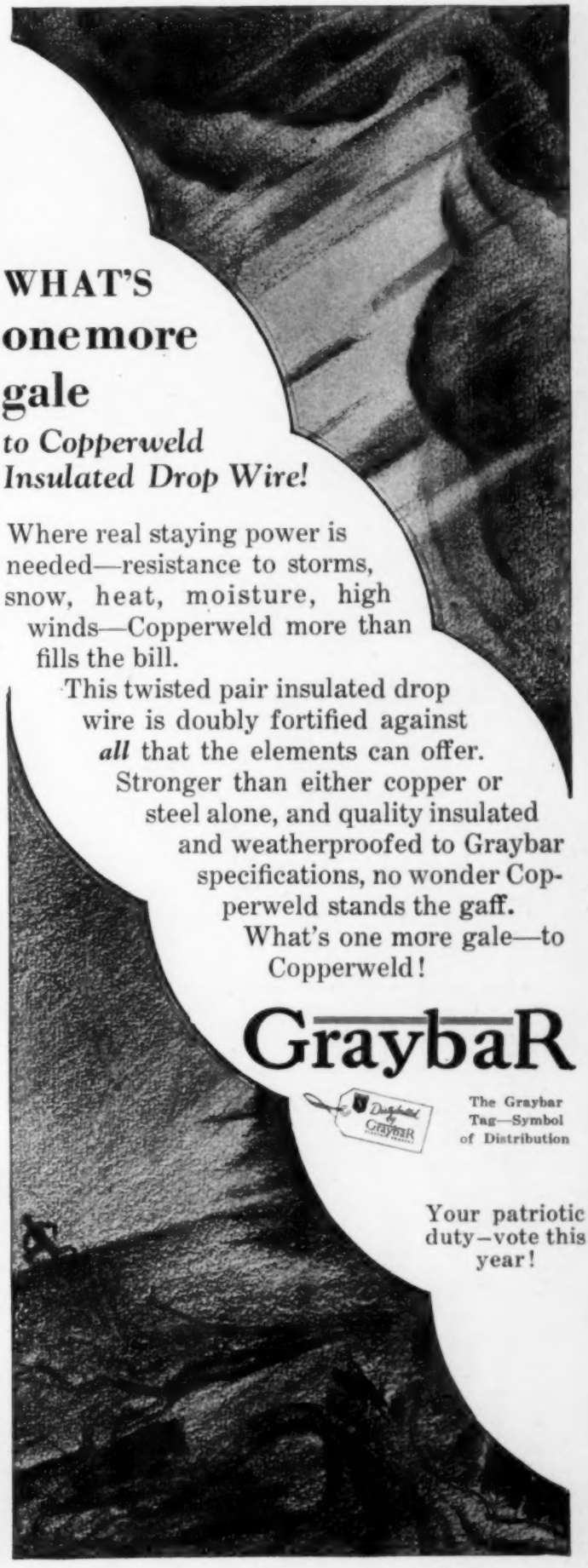
Comfort and Service at Moderate Rates

Finest food at lowest prices in Coffee Shop and Cafeteria.....

Garage Accommodations

RATES
ONE PERSON WITH BATH
$1.50 and $2.
TWO PERSONS WITH BATH
$2.50 and $3.

IN THE HEART OF THE LOOP IN CHICAGO



WHAT'S one more gale to Copperweld Insulated Drop Wire!

Where real staying power is needed—resistance to storms, snow, heat, moisture, high winds—Copperweld more than fills the bill.

This twisted pair insulated drop wire is doubly fortified against *all* that the elements can offer. Stronger than either copper or steel alone, and quality insulated and weatherproofed to Graybar specifications, no wonder Copperweld stands the gaff.

What's one more gale—to Copperweld!

GraybaR

The Graybar Tag—Symbol of Distribution

Your patriotic duty—vote this year!

TELEPHONY AIDS DEAF

Humanitarian by-products of the telephone industry were featured by the Bell Telephone Company of Pennsylvania in its exhibit at the Electric and Radio Show during September at the Convention Hall in Philadelphia.

Some of these enable deaf persons to hear normal voice tones both over the telephone and in direct conversation.

Others enable those whose speech is unusually faint to make themselves heard as clearly over the telephone as persons whose voices are normal.

Still more startling is a device known as the artificial larynx which actually restores the power of easily understood speech to persons who have lost their larynges through surgical removal or disease. It was arranged to have a man who for some time has been using an artificial larynx serve as a demonstrator at the show.

Never-ending research by scientists of the Bell Telephone Laboratories, New York, in the direction of constant improvement of standard telephone equipment, is responsible for the production of the synthetic larynx and a large number of other devices whose everyday application is strictly helpful to persons with impaired hearing or speech.

The laboratories form the research unit of the American Telephone and Telegraph Company, with which the Bell of Pennsylvania is associated. With speech and hearing fundamental in the telephone service, it is easily understandable why these beneficial by-products should spring from the researches of the laboratories' scientific staff.

In addition to these exhibits, the Bell Company had on display an attractive model home showing the most recent form of telephone wiring plans and telephone equipment for household purposes. This occupied the centre of the display.

The device through which persons with defective hearing are enabled to hear normal telephone conversations consists of special amplifying receiving apparatus, commonly known as a "deaf set." Its function is to "step up" the volume of incoming conversation to a point clearly audible to the telephone user whose hearing is impaired.

DIAL PHONES FOR STOCKHOLM

Every telephone in Stockholm, Sweden, will have a dial in a year or two, under plans formulated by the Swedish government Telephone and Telegraph board.

FOR SALE

200 Western Electric common battery steel bell boxes, enclosed gongs, refinished at $3.00 each. Corwin Electric Co., Indianapolis, Indiana.

J. G. WRAY & CO.
Telephone Engineers
Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization and Operation of Telephone Companies
J. G. Wray, Fellow A. I. E. E.
Cyrus G. Hill
Rm. 2626 Bankers Bldg., Chicago

RECONSTRUCTED EQUIPMENT

Kellogg No. 30A 100 ohm combine line drops and jacks 10 per strip @	$10.00
Any Make Transmitter repaired and enameled @	.50
Any Make Receiver unit repaired (Bobbins rewound) @	.45
Western Elec. No. 315 3-bar 1000-1600 or 2500 ohm Monophone signal sets @	5.00
Stromberg 4-bar 1000-1600 or 2500 ohm Monophone signal sets @	5.50
New Cabinet 5-bar 1000-1600 or 2500 ohm Monophone signal sets @	6.25
Kellogg latest type unbreakable desk set with 3-bar 1000-1600 or 2500 ohm inside connection signal set @ $10.00—4-bar @ $10.50—5-bar @	11.00
Western Elec. No. 329 or Kellogg No. 22 Transmitters with back @	1.10
Western Elec. No. 317 3-bar 1000 ohm Bdg. compacts with 3 inch gong ringers @	6.60
Cook No. 8 Arresters with heat coils per bank of 20 lines @	6.50
Used 3 conductor desk set cords with clips of tips both ends @	.25
Strombery New No. 53x Plugs with new 6 foot cords attached @	.75
New Western Elec. No. 143 Rec. Shells with caps @	.37
Kellogg, Dean or Monarch 100 ohm drop coils @ 35c—500 ohm 45c—1000 ohm @	.50
Stromberg No. 11 combine line drops and jacks per strip of 5 @	7.00
Stromberg No. 11 350 ohm drop coils @	.45
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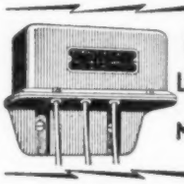
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